

OCEANO COMMUNITY  
SERVICES DISTRICT

December 1, 2017



PROPOSAL TO PREPARE A  
**WATER RESOURCE  
RELIABILITY PROGRAM &  
OPTIONAL DESIGN SERVICES**



**MR. PAAVO OGREN**

General Manager  
Ocean Community Services District

**PROPOSAL TO  
PREPARE A**

Water Resource Reliability  
Program & Optional Design  
Services

**WATER SYSTEMS  
CONSULTING, INC.**

805 Aerovista Place, Suite 201  
San Luis Obispo, CA 93405  
Phone (805) 457-8833  
Fax: (805) 888-2764

*Dear Mr. Ogren,*

Water Systems Consulting, Inc., (WSC) is pleased to present Oceano Community Services District (OCSD) with this proposal to prepare a Water Resource Reliability Program (WRRP) and Optional Design Services to address capacity and condition-based deficiencies, evaluate deferred infrastructure replacement requirements, and identify opportunities to enhance groundwater recharge within OCSD's service area.

OCSD intends to utilize Proposition 84 funds to develop a Recycled Water Injection Well Site Plan, a Low Impact Development (LID) Plan, and a Leak Detection and Management Plan as part of the planning portion of the WRRP, Phase 1. For this project, WSC has put together a comprehensive team of local water resource and infrastructure experts to maximize the value of the WRRP and to support related regional water resource initiatives.

Based on the results of recent leak detection investigations and conversations with OCSD Staff, WSC believes that additional leak detection may not be the best approach for reducing water loss and that the available grant funds may be better spent assisting OCSD in addressing other water system infrastructure and management needs. As such, WSC proposes to modify the Phase 1 WRRP to include the following primary elements:

**Water System Management Toolsets** – Modernizing OCSD's management systems and toolsets will enable proactive and efficient management of the water system.

**Condition Based Assessment** – To complement the existing capacity based CIP, a condition based assessment will assist in identifying infrastructure elements that have, or will soon, exceed their Remaining Useful Life. As well as project long range asset replacement needs.

**Comprehensive Capital Improvement Plan (CIP)** – Incorporating both capacity and condition based criteria in a comprehensive CIP will enable OCSD to focus its resources on addressing the system's most critical needs.

**Groundwater Recharge** – Investigate potential opportunities to improve the reliability of the groundwater supply, including siting of injection wells for the Regional Groundwater Sustainability Project (RGSP) and evaluation of potential LID elements into the San Luis Obispo County's updated drainage study for the Oceano area.

WSC and our team of specialized subconsultants are well equipped to assist OCSD in completing each of the elements described above. Additionally, WSC is experienced and qualified to provide design services for the critical projects identified in the WRRP. Our extensive water resources planning and design experience in San Luis Obispo County, including our work on the RGSP and with Northern Cities Management Area Technical Group (NCMA), puts us in an ideal position to assist OCSD in leveraging related ongoing water resource initiatives.

WSC is a civil and environmental engineering consulting firm that specializes in innovative water solutions, relationship building, and bringing value to our clients. WSC was founded 10 years ago and has a staff of nearly 40 skilled professionals who provide water resources, wastewater, and recycled water engineering services to special districts, counties, cities, and investor-owned utilities from seven offices throughout California and Oregon, including our headquarters in San Luis Obispo. WSC is an S-Corporation and Certified Small Business with the State of California (No. 51018) and a Certified Minority Business Enterprise with the CPUC Supplier Clearinghouse (No. 9IS00088).

We received the OCSD Request for Proposals and attended the tour of OCSD Water Facilities. Our proposal is valid for a 90-day period from the date of the submission and our contact information is included above.

We hope you review our proposal in detail to understand how we propose to help OCSD develop a thorough WRRP that maximizes the use of available grant funds and ensure your water system can continue to reliably serve your community. We are confident that we are the right team for the job, and would greatly appreciate the opportunity to work with you on this important project. If you have any questions or would like to discuss any aspect of our proposal further, please contact WSC's proposed Project Manager, Mr. Daniel Heimel, at (805) 457-8498, ext. 104 (dheimel@wsc-inc.com) or WSC's Vice President, Mr. Joshua Reynolds, at (805) 457-8833, ext. 107 (jreynolds@wsc-inc.com). Thank you for this opportunity, and we look forward to your response.

*Sincerely,*

*Water Systems Consulting, Inc.*



.....  
**DANIEL HEIMEL, PE, MS,  
D4 & T2 WATER OPERATOR**



.....  
**JOSHUA REYNOLDS, PE, MS**

# WSC IS YOUR PREMIER WATER ENGINEERING CONSULTING FIRM

Water Systems Consulting, Inc. (WSC), is a civil and environmental engineering consulting firm that specializes in innovative water solutions, relationship building, and bringing value to our clients.

WSC was founded 10 years ago and has a staff of nearly 40 skilled professionals who provide water resources, wastewater, and recycled water engineering services to special districts, counties, cities, and investor-owned utilities from seven offices throughout California and Oregon, including our headquarters in San Luis Obispo. WSC is an S-Corporation and Certified Small Business with the State of California (No. 51018) and a Certified Minority Business Enterprise with the CPUC Supplier Clearinghouse (No. 9IS00088).

Oceano Community Services District (OCSD) is looking for a consultant to provide engineering and related services for its Water Resource Reliability Program (WRRP) which includes a Recycled Water Injection Well Site Plan, Low Impact Development Plan, and a Leak Detection and Management Plan while maintaining compliance with grant requirements. WSC is uniquely qualified to provide those services through our current work as Program Manager for the Regional Groundwater Sustainability Project (RGSP) and our knowledge of the Oceano area through our work with nearly all the water and wastewater agencies in southern San Luis Obispo County.

WSC and our proposed team of subconsultants has the technical understanding and resources to provide value-added solutions for OCSD's Water Resource Reliability Program while ensuring it meets the funding requirements set out in the Prop 84 Integrated Regional Water Management Plan (IRWM) Grant Guidelines. The qualifications and relevant project experience for our team are outlined in the following pages.

At WSC, we only succeed if you do. We are focused on delivering value, and will work tirelessly on your behalf to achieve the results that you and your ratepayers deserve.

WSC has been recognized as one of the **Fastest-Growing Firms** two years in a row by *Inc. Magazine*, as well as one of the **Best Places to Work** in 2017.



WSC has **six certified operators** on staff.



WSC has a unique understanding of California's Central Coast water challenges, and delivers creative and practical **water system solutions**.



We have **seven offices** serving clients throughout the West Coast.



**Expect WSC:** Personalized Service. Sustainable Solutions. Exceptional Value.



We currently provide staff augmentation services to over **35 clients**.

# EXTENSIVE PLANNING & DESIGN EXPERIENCE WITHIN SAN LUIS OBISPO COUNTY

Before design and construction begins on any project, a well informed and thought-out plan needs to be in place to ensure the investment of resources is necessary and the project can be done efficiently. WSC utilizes industry-recognized best practices, innovative tools, and creative approaches to deliver functional and resilient planning services. Our team can provide sustainable day-to-day and long-term solutions that will ensure OCSD's water system and water resources needs are met. Our team is experienced in providing hydraulic modeling, condition assessment, data analysis, regulatory compliance, and feasibility studies to develop implementable and cost-effective Capital Improvement Programs. Whether developing leak detection and management plans, condition-based assessments, hydraulic modeling services, or comparing the cost to benefit of a project in an alternatives analysis, we will collaborate with OCSD to ensure you are informed and your needs are being met. We will prepare robust and defensible documentation that can be utilized in funding compliance, and provide clear prioritization and reliable cost estimates.

WSC's design team has extensive hands-on, practical experience designing and delivering hundreds of water infrastructure projects, including the design of water and recycled water pipelines, wells, booster pump stations, and treatment plants. WSC's staff can serve in a variety of capacities on design projects, including technical oversight, advisory and/or project management roles. Our forward-thinking staff and thorough QA/QC process ensures you receive cost-effective designs that ultimately minimize construction change orders. WSC staff members have experience working for both the private and public sector, allowing our team to design all projects with an owner's perspective which leads to operator friendly infrastructure. Clients recognize our staff as excellent collaborators, communicators, and leaders.

WSC HAS PROVIDED  
PLANNING & DESIGN  
SERVICES TO NEARLY

**20 AGENCIES**

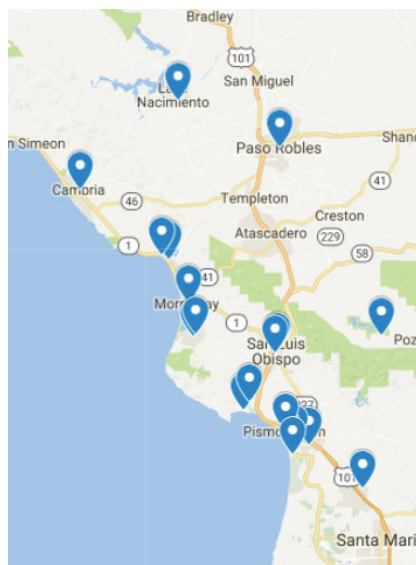
WITHIN SAN LUIS  
OBISPO COUNTY



“WSC has worked seamlessly as an extension of our staff to assist us in the pre-design, permitting, final design and construction administration of many of our water infrastructure replacement projects. Their involvement has improved our ability to stay on scope and on budget while meeting the ever increasing number of stakeholder concerns.”

- Mr. Richard Svindland, PE,  
California American Water

## CLIENTS WSC HAS SERVED IN SLO COUNTY:



- Avila Beach CSD
- Cayucos Sanitary District
- City of Arroyo Grande
- City of Grover Beach
- City of Morro Bay
- City of Paso Robles
- City of Pismo Beach
- City of SLO
- County of SLO
- Heritage Ranch CSD
- Los Osos CSD
- Los Osos Groundwater Basin Management Committee
- Morro Rock Mutual Water Company
- Nipomo CSD
- San Luis Obispo County Flood Control & Water Conservation District
- San Miguelito Mutual Water Company
- South San Luis Obispo County Sanitation District
- Cambria CSD

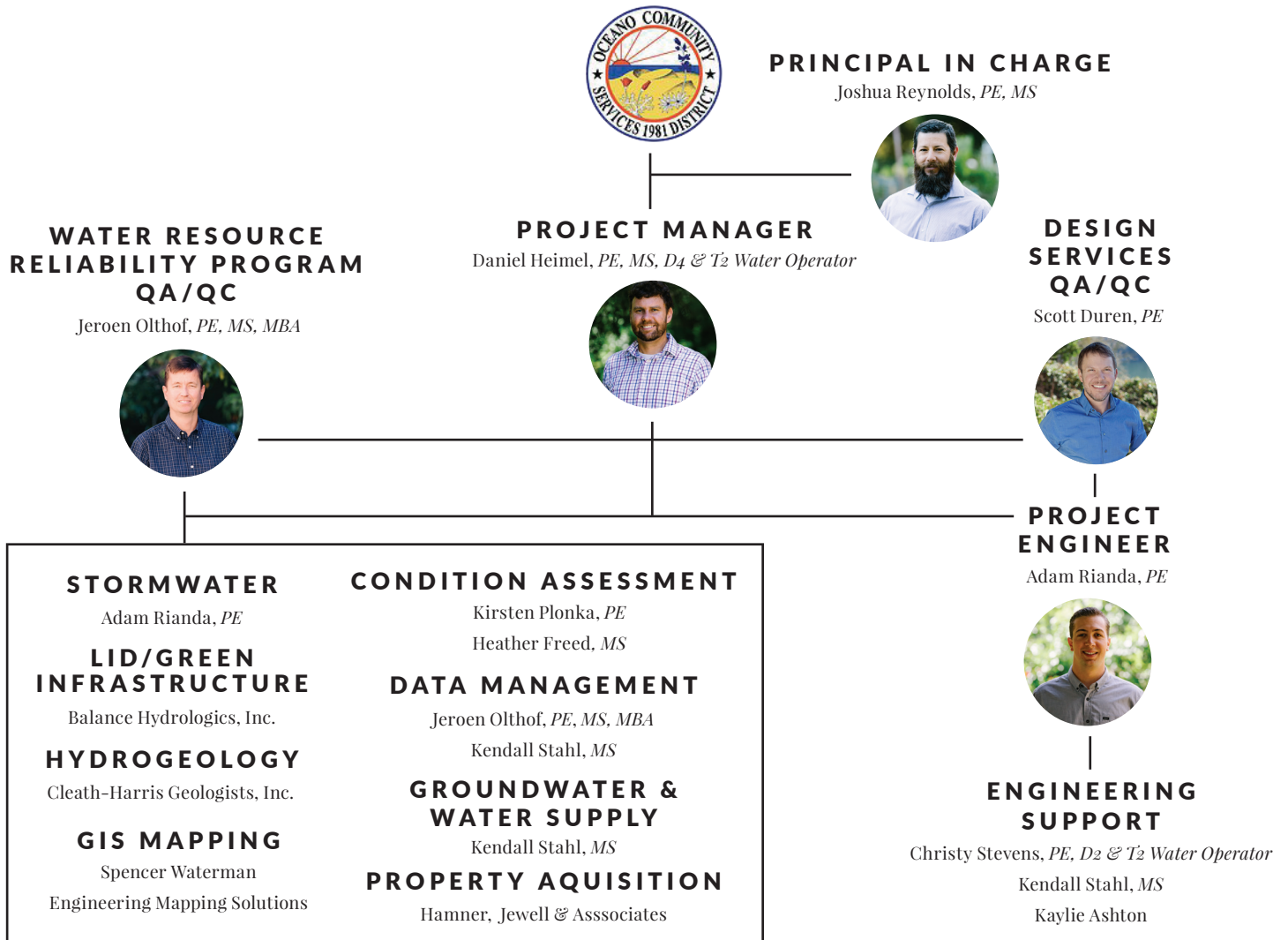
# TEAM ORGANIZATION

WSC’s team is functionally organized to take advantage of the strengths of our expert staff within a streamlined structure to provide the highest level of responsiveness and quality.

WSC’s proposed Project Manager, Daniel Heimel, will serve as the primary point of contact for the Water Resource Reliability Program. Daniel has extensive water resource engineering experience on the Central Coast, including providing services to the NCMA TG and the RGSP. Daniel will leverage his knowledge of the region and the RGSP to provide cost-effective and value-added services to OCSD.

Daniel will be supported by WSC’s Principal in Charge Joshua Reynolds, who has completed numerous projects in the Five Cities area. Our team has been strategically organized with Jeroen Olthof leading QA/QC for the WRRP and a highly qualified team of WSC staff and specialized subconsultants to develop it. Design QA/QC lead Scott Duren and our team of skilled design engineers are prepared to provide OCSD with any optional/supplemental design services for water infrastructure projects identified in the WRRP.

In addition to WSC staff, Daniel will also be supported by a team of subconsultants to provide specialized services. For hydrogeology services, Cleath-Harris Geologists, Inc., (Cleath-Harris) will supplement the WSC team. WSC and Cleath-Harris have worked together on the RGSP and multiple recycled water facilities planning studies within San Luis Obispo County. WSC’s proposed team also includes Balance Hydrologics, Inc. (Balance) for LID/Green Infrastructure services Engineering Mapping Solutions (EMS) for mapping services, and Hamner, Jewell & Associates (HJA) for any property acquisition services required for the projects identified in the WRRP. Furthermore, information about each of our team members is included on the following pages and consolidated resumes are included in Appendix A.



# MEET THE TEAM



**DANIEL HEIMEL, PE, MS,**  
D4 & T2 WATER OPERATOR

**Project Manager** | Mr. Heimel has spent the majority of his 15-year career providing engineering and operations support for municipal water agencies. Recently he has provided water resources engineering and program management services to the NCMA agencies, including for the RGSP. Prior to joining WSC, he worked for two public water utilities and his experience includes program management, hydraulic modeling, GIS implementation, sampling plan development and implementation, water quality and watershed monitoring, groundwater recharge facility operations, and water quality data analysis.

## SAMPLE PROJECTS:

- Project Manager for the Regional Groundwater Sustainability Project in collaboration with OCSD, Cities of Pismo Beach, Arroyo Grande, Grover Beach, and South San Luis Obispo County Sanitation District Beach which was developed out of a Recycled Water Facilities Planning Study conducted by WSC.
- Project Manager for NCMA Technical Group's Fiscal Year 2014-15 Water Supply, Production and Delivery Plan which included evaluation available water supply, delivery capacity and demand patterns to optimize surface water deliveries to the NCMA agencies and allow them to minimize their groundwater pumping.
- Project Engineer for City of Arroyo Grande's Water System Master Plan Update which included using GIS tools and the hydraulic model to perform a capacity and condition-based assessment of the City's water system.



**JOSHUA REYNOLDS,**  
PE, MS

**Principal In Charge** | Mr. Reynolds has 18 years of experience in hydraulic analysis, condition and capacity-based assessment, pipeline, pump station, and tank design and analysis, construction management and administration, and city/district engineering. His strong combination of planning, design, and construction experience enables him to develop accurate cost estimates, risk-based prioritization, and identify efficient solutions. He has extensive experience leading projects in the Five Cities area, including the design and construction of pipelines, pump stations and reservoirs for the cities of Arroyo Grande and Pismo Beach.

## SAMPLE PROJECTS:

- Project Manager for City of Pismo Beach's 2015 Water Master Plan Update which included developing condition-based replacement plans for aging infrastructure and utilizing the hydraulic model to evaluate capacity limitations.
- Project Manager for City of Santa Maria's Utilities Capacity Study which included developing a prioritized, risk-based capital improvement plan.
- Project Manager and/or Engineer for multiple infrastructure replacement/upgrade projects for the cities of Pismo Beach and Arroyo Grande, including a reservoir replacement, and several pipeline and pump station projects.
- Technical Advisor for the Regional Groundwater Sustainability Project in collaboration with OCSD, South San Luis Obispo County Sanitation District, and the Cities of Pismo Beach, Arroyo Grande, and Grover Beach.



**JEROEN OLTHOF, PE,**  
MS, MBA

**Water Resource Reliability Program QA/QC** | Mr. Olthof has more than

25 years of planning, design, and operations experience specializing in hydraulic modeling and feasibility studies. His experience includes evaluating water supply and groundwater treatment alternatives. He is a nationally recognized industry-leader in hydraulic modeling, GIS integration, and data analysis and management. He has completed more than 125 hydraulic modeling projects and over 30 Master Plans throughout California.

**SAMPLE PROJECTS:**

- Project Engineer for Calaveras County Water District's Ebbetts Pass Water Master Plan which included evaluating pipe leaks, malfunctioning pressure reducing valves, Haloacetic Acid formations in the water, and pressure regulation.
- Project Engineer for Orange County Water District's Recharge Water Sediment Removal Feasibility Study which included evaluating potential technologies and strategies to maximize groundwater recharge.
- Senior Engineer for San Bernardino Valley Municipal Water District's Regional Recycled Water Concept Study & Grant Application which included evaluating project alternatives to improve local water supply reliability and sustainability for 10 separate agencies.



**SCOTT DUREN, PE**

**Design Services QA/QC** | Mr. Duren has more than 16 years of civil engineering experience specializing

in water pumping and conveyance infrastructure. He has served as Project Engineer or Project Manager on numerous pipeline and pump station design, stormwater discharge and quality, and civil site development projects. His experience also includes full-system evaluation, operation, and risk-based prioritization for timely budgeting and capital improvements.

**SAMPLE PROJECTS:**

- Senior Technical Reviewer for multiple water system rehabilitation projects for California American Water Company which included technical reviews of design and construction documents for distribution and pumping infrastructure replacements.
- Project Manager for the Sheridan Water Supply Project for Placer County Facility Services where he oversaw the design and construction of a water supply well, booster pump station, storage tank, and approximately one half mile for pipeline.
- Project Manager for Placer County Water Agency's Long Ravine Pipeline Replacement Project which included analyzing alternatives, designing, and providing permitting support for approximately one mile of pipeline.



**TIMOTHY CLEATH, HG,**  
CEG, PG, MS

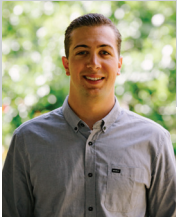
**Hydrogeology** | Mr. Cleath is a professional geologist, certified hydrogeologist, and certified

engineering geologist, as well as President of Cleath-Harris Geologists, Inc. He has extensive understanding of water resources gained through more than 30 years of hands-on experience and personal involvement with water issues on the Central Coast. His knowledge of local groundwater conditions and his working relationship with local and state agencies facilitates and expedites projects.

**SAMPLE PROJECTS:**

- Partnered with WSC on the Regional Groundwater Sustainability Project which included identifying injection and monitoring well sites, and establishing injection well/extraction well scenarios.
- Assisted City of Arroyo Grande with Well Siting Studies which included evaluating possible well sites, geologic mapping, preparing geologic cross sections, and groundwater quality assessments.
- Directing the hydrogeologic characterization of the San Luis Obispo portion of the San Luis Obispo Valley Groundwater Basin for the City of San Luis Obispo.





## ADAM RIANDA, PE

**Design Project Engineering & Stormwater** | Mr. Rianda is a Professional Civil Engineer with

experience designing potable water mains, pump stations, and storage tanks. He also brings extensive knowledge of hydrology and hydraulics, including stormwater management planning and design and modeling. Additionally, he has conducted condition assessments on water systems, evaluated hydraulic capacity and energy consumption of water system infrastructure. His background in planning and design informs his ability to design infrastructure that has the appropriate capacity and capabilities.

### SAMPLE PROJECTS:

- Staff Engineer for California Water Service's Dominguez 232 Pump Station Upgrade which included the design of a booster station with four 2,500 gpm vertical turbine pumps and new site piping.
- Staff Engineer for the County of San Luis Obispo's CSA 10A Cayucos Tanks Replacement which includes design of two 210,000 gallon water storage tanks.
- Assistant Engineer for Monterey County Water Resources Agency's Canyon del Rey Master Drainage Plan which included hydrologic and hydraulic modeling of the watershed for use in analysis of stormwater facilities.
- Assistant Engineer for the Promenade Property Stormwater Management Planning and Design in Antioch for the design of two stormwater basins, mitigating increased stormwater runoff and peak flows while providing water quality treatment.



## KIRSTEN PLONKA, PE

**Condition Assessment** | Ms. Plonka has more than 15 years of experience serving as both a consultant and

District Engineer. Her master planning and condition assessment experience includes effective use of existing data, understanding of future demands and impacts on water systems, hydraulic modeling, asset management programs, and CIP development. Her previous work as District Engineer for a municipal water utilities provides her with familiarity of similar water systems, staff expectations, and internal operations.

### SAMPLE PROJECTS:

- Project Manager for Casitas Municipal Water District's Condition Assessment of the Water Distribution System and Master Plan which includes assessing the condition of their water system and preparing a Capital Improvement Plan for the transition of a water system to a new owner.
- District Engineer for Rainbow Municipal Water District which included converting, updating, calibrating and utilizing the District's hydraulic water model, and reviewing its GIS-based Asset Management Plan.
- Project Engineer for the Water Utility of Greater Buckeye's Global Water Due Diligence Facilities Report which included condition assessments, site layout evaluations, and inventories of water infrastructure.



## CHRISTY STEVENS, PE, D2 & T2 WATER OPERATOR

**Engineering Support** | Ms. Stevens has more than 12 years of experience working for a public water utility

and as a consulting engineer. Her experience includes hydraulic analysis, master and capital improvement planning, design, project management, and construction administration for water system infrastructure projects. Her experience leading projects from inception to start-up, gives her a comprehensive perspective that informs her ability to design cost-effective, appropriately-sized, and operator-friendly infrastructure.

### SAMPLE PROJECTS:

- Project Engineer for Big Bear Lake Department of Water and Power's Water System Improvement Projects which included design of two well pumping plants, a 500 gpm booster pump station, a 1 MG reservoir, and approximately 14,000 LF of potable water pipeline.
- Project Engineer for Liberty Utilities' Water Main Replacement Projects which included the design of more than 16,000 LF of pipeline ranging in size from 8-inches to 20-inches.
- Project Engineer for City of Victorville's Water Master Plan and On-Call Water Modeling which included preparing a 20-year comprehensive CIP and developing and supporting a hydraulic model of the system.



## SPENCER WATERMAN

**GIS Mapping** | Mr. Waterman is an experienced Planner who has completed more than 50 technical planning studies. He is the lead author or technical advisor for nearly 30 Urban Water Management Plans and has served in an integral role on more than 10 master plans. He has extensive experience developing grant funding applications and state water law compliance documents, providing water use efficiency and conservation services, and utilizing GIS to spatially allocate water demands and develop maps for clients.

### SAMPLE PROJECTS:

- Staff Planner for the Northern Cities Management Area Technical Group's On-Call Engineering contract which includes IRWM funding application support and analysis of water supply and demand data to inform water resources management actions.
- Lead Planner for City of Victorville's Feasibility Studies and Water Supply Assessments which included GIS and data management support for the City's InfoWater model.
- Staff Planner for Big Bear Lake Department of Water and Power's Atlas Map Update which included converting AutoCAD atlas maps into GIS format, and updating map using as-built information, mark-ups, and a pipeline inventory database.



## EDWARD BALLMAN, PE

**LID / Green Infrastructure** | Mr. Ballman addresses a wide range of hydrologic and hydraulic analysis and design problems at both the site and watershed scales. He also leads Balance's program of verifying and calibrating computer simulations with either field results or physical models. As Principal Engineer at Balance, Mr. Ballman has established and implemented rigorous QA/QC procedures for numerous large engineering projects throughout California.

### SAMPLE PROJECTS:

- Principal in Charge for the City of Alameda's Stormwater Management and Flood Control Planning Assistance for Alameda Point which included C.3 compliance, stormwater strategy, flood control, and sea level rise.
- Principal in Charge for Monterey County's Updated Flood Control Project Report for County Services Area 50 which included 1D hydraulic modeling to assess the interior drainage functionality of CSA-50 and design flood control components to remove the area from the FEMA floodplain.
- Principal in Charge for the City of Marina's University Villages Stormwater Infrastructure Design which included a hydrologic model of the proposed underground stormwater facilities designed to detain and infiltrate runoff from storms up to the calculated 100-year recurrence interval event.



## TERESA GARRISON, PE

**LID / Green Infrastructure** | Ms. Garrison is a Professional Civil Engineer with a focus on water resources and water quality treatment within natural systems. She specializes in meeting the California stormwater treatment and detention (C.3) requirements. She models for water quality, runoff reduction, and surface groundwater recharge using a variety of modeling platforms, including the US Army Corps of Engineers HEC-HMS model.

### SAMPLE PROJECTS:

- Stormwater Planning for Placer County's Government Center Master Plan Update which included area-wide stormwater modeling with XP Storm computer software to evaluate existing conditions and identify areas for stormwater storage improvements.
- Project Manager for Castro Valley's Stormwater Drainage Modeling and Stormwater Management Plan, Roberts Ranch Development which included evaluating and modeling the stormwater systems design to comply with regional and state requirements.
- Project Manager for City of Brentwood's Stormwater Drainage Modeling which included hydrologic and hydraulic modeling of the flow-duration control performance of the stormwater infrastructure at the proposed development.



## KENDALL STAHL, MS

### Groundwater & Water Supply, Data Management, Engineering Support

Ms. Stahl is an Engineer in Training who specializes in hydrology and hydraulics analysis and water resources planning. She has experience in water quality assessment and groundwater contamination analysis, water resources engineering, and flood modeling. She is familiar with OCSD's staff and water system through her work as a staff engineer providing on-call engineering services to the NCMA agencies. She is knowledgeable of the RGSP from her role developing the hydrogeologic analysis for the project.

### SAMPLE PROJECTS:

- Engineering Support for the Northern Cities Management Area Technical Group's On-Call Engineering Services contract which includes updating monthly groundwater production reports and the database, as well as developing a comparison summary of annual reports from the NCMA and the NMMA.
- Engineering Support for the Regional Groundwater Sustainability Project, where OCSD is a partner agency, and includes supporting the development of the hydrogeologic analysis which gives her understanding of the regional and project context of the injection well sites.
- Engineering Support for Avila Beach Community Services District's Water Resource Analysis which includes evaluation and assembly of water resource reliability data, supply and demand characterization, and conditional dry and average supply and demand comparison information.



## HEATHER FREED, MS

### Condition Assessment & Engineering Support

Ms. Freed is an Engineer in Training who specializes in evaluating hydraulic measures, including headloss through pipes, hydraulic jumps, and groundwater pumping. Her experience includes groundwater contamination, water chemistry and water quality measurements, water treatment, climate change and energy intensity analysis services. She has a deep understanding of water distribution systems and of the requirements of similar projects within San Luis Obispo County.

### SAMPLE PROJECTS:

- Engineering Support for Casitas Municipal Water District's Condition Assessment and Water Master Plan which includes assessing the condition of the water system and preparing a Capital Improvement Plan for the transition of a water system to a new owner.
- Engineering Support for City of Pismo Beach's 2015 Water Master Plan Update which includes development and calibration of an all-pipes, spatially allocated demand hydraulic model and condition-based assessment of aging infrastructure.
- Engineering Support for California National Guard's Camp Roberts' Water System Treatment Facility Evaluation which included assessment of the water distribution system, infrastructure and operations alternatives.



## KAYLIE ASHTON

### Engineering Support

Ms. Ashton is an Engineer in Training with experience in water pipeline design, hydrology and hydraulic analysis, master planning, and hydraulic modeling of water distribution systems. She has extensive hydraulic modeling and design experience for water distribution systems. Through her past work and education, she has developed a practical understanding of how to apply engineering practices to deliver insightful and operator-friendly projects.

### SAMPLE PROJECTS:

- Engineering Support for Big Bear Lake Department of Water and Power's Sawmill Well Pumping Plant which included the design of a 350 gpm well pumping plant, 600 LF of 6-inch PVC pipeline, site improvements, and a CMU building.
- Engineering Support for City of Pismo Beach's Water Main Replacement which included an alternatives analysis to improve fire flow and service pressure and design of 1,750 LF of 8-inch pipeline, a PRV station, and 21 water service tie-overs.
- Engineering Support for Liberty Utilities' Water Main Replacements which included designing 12,165 LF of 12-inch and 17,450 LF of 8-inch water mains in street right-of-way.

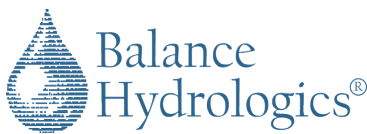
# WSC BRINGS STRATEGIC PARTNERS TO DELIVER OPTIMAL RESULTS

WSC has strong partnerships with several respected firms with local, specialized experience that provide complimentary and supporting services for the Water Resources Reliability Program. WSC has existing synergies with all of our team members through our experience on other projects, including with Cleath-Harris Geologists during the planning phase of the Regional Groundwater Sustainability Project. This experience ensures our team is familiar with each other's internal procedures, standards, and expectations and allows our team to hit the ground running. Additional information on the qualifications and credentials of the individuals that will be supporting the WSC team is included in their resumes in Appendix A.



**Cleath-Harris Geologists, Inc.**, has been providing geological services to the Central Coast for more than 30 years, including in Oceano and the surrounding area. Their long-term experience with the planning and implementation of groundwater supply projects has resulted in familiarity with the local hydrogeology, development and use of the appropriate analytical groundwater planning tools, and the designs for water supply facilities that suit this environment.

Mr. Timothy Cleath will bring his expertise as a certified hydrogeologist and engineering geologist to the WRRP. WSC developed a seamless working relationship with Cleath-Harris Geologists, Inc. through our work together on six projects within San Luis Obispo County in recent years including providing hydrogeologic analysis for the Regional Groundwater Sustainability Project. Cleath-Harris Geologists, Inc. will provide groundwater basin management, geotechnical investigations, and field exploration studies.



**Balance Hydrologics, Inc.** is a full-service hydrology firm and a recognized leader in the analysis of watershed, channel, and groundwater dynamics. Balance applies a field-based approach to characterizing watersheds, groundwater, hydrologic, and sediment transport systems in a manner that recognizes the site-specific nature of water distribution and movement in complex environments.

Balance's team of engineers and scientists, including principal engineer Edward Ballman, PE, and civil engineer Teresa Garrison, PE, are well versed in many hydraulic modeling platforms, and have experience developing storm drain master plans for projects that include single culvert crossings to those that cover an entire city. Balance and WSC worked together as part of the Owner's technical team for California American Water Company's \$85 million San Clemente Dam and Carmel River Reroute Project.



**Engineering Mapping Solutions, Inc.**, is a cost-effective industry-leader in the conversion of engineering documents to GIS-ready digital data and has developed some of the most robust GIS projects in the country. The services EMS provides includes needs assessment, system design, implementation, customization, training, and technical support to ensure complete GIS success. EMS and WSC worked together on four projects, including for San Miguelito Mutual Water Company's Avila Baseline Water and Wastewater

Capacity Evaluation project which included completing digitization of the water and wastewater facilities backbone maps in a GIS database.



**Hamner, Jewell & Associates** is a specialized real estate consulting firm with an office in Pismo Beach. HJA provides services to local public agencies with an emphasis on acquiring the rights of way and property rights for all types of public works projects, including water conveyance facilities. Those services include appraisal of property for use in support of easement acquisition. HJA's services are designed with the specific intent of successfully acquiring property by agreement, minimizing the instances in which eminent

domain action would be otherwise required. WSC has an established partnership with HJA and is currently working together on the City of Camarillo's North Valley Desalter Project.

# NORTHERN CITIES MANAGEMENT AREA TECHNICAL GROUP

Delivering cost-savings & innovative One Water solutions

WSC has provided water resources consulting services for nearly eight years to the NCMA Technical Group, which is comprised of staff representatives from OCSD, and the Cities of Pismo Beach, Arroyo Grande, and Grover Beach, and is tasked with monitoring and managing municipal groundwater pumping of the Santa Maria Groundwater Basin.

Through our staff extension services role, WSC provides water resources engineering support, meeting planning and facilitation, and special project development and management. WSC supports stakeholder outreach, consultant management, the annual reporting process required by the groundwater basin adjudication, and technical studies to support the ongoing initiatives.

WSC is also the Program Manager for the Regional Groundwater Sustainability Project. The RGSP is an Indirect Potable Reuse project that will recover secondary effluent from the

City of Pismo Beach and South San Luis Obispo County Sanitation District's wastewater treatment plants. Using advanced treatment and the use of injection wells, the RGSP will provide groundwater recharge and protection from seawater intrusion into the Santa Maria Groundwater Basin. The RGSP was identified as the most beneficial recycled water project alternative in the Recycled Water Facilities Planning Study developed by WSC.

In addition to the support that WSC provides to the NCMA TG and the RGSP, WSC has supported each of the NCMA agencies on a variety of projects, including urban water management planning, water master planning, and design services for the Cities of Arroyo Grande, Grover Beach and Pismo Beach. We supported the Groundwater Sustainability Agency (GSA) formation and Sustainable Groundwater Management Act (SGMA) support services for the City of Arroyo Grande, as well.



## VALUE-ADDED RESULTS

WSC ASSISTED NCMA AGENCIES  
IN SECURING APPROXIMATELY

**\$2.5 MILLION**

IN GRANT FUNDING FOR WATER, WASTEWATER  
& RECYCLED WATER PROJECTS.



“WSC is very knowledgeable and responsive. They have proven themselves to be fair, understanding, and willing to go the extra mile to see a project succeed. I would highly recommend WSC.”

– Mr. Benjamin Fine, PE, Public Works Director/City Engineer,  
City of Pismo Beach



## RELEVANCE

- Strong understanding of NCMA water resources and water system infrastructure.
- Extensive involvement in the RGSP and are currently overseeing development of the groundwater model, the EIR, and providing engineering and property acquisition services.
- Knowledgeable of OCSD's staff and infrastructure through work with the NCMA TG and the Zone 3 Technical Advisory Committee.
- Assisted the NCMA Agencies in pursuing and obtaining grant funding and low interest financing for water projects.

## WATER MASTER PLAN & CONDITION BASED ASSESSMENT

CASITAS MUNICIPAL WATER DISTRICT, OJAI, CA

The Casitas Municipal Water District recently acquired the operating assets of Golden State Water Company’s water system within the City of Ojai without a full understanding of the condition and operation of the Ojai system. WSC is conducting a condition-based assessment and developing a Water Master Plan that includes three-and 10-year capital improvement projects and capital budgets. Tasks include developing opinions of probable cost for recommended projects, evaluating production and consumption data to develop projections, and recommend improvements necessary to maintain a safe and reliable level of service. WSC is also assisting the District in developing management systems for their newly acquired distribution assets.

### RELEVANCE TO OCSD

- Conducting a condition-based assessment to identify infrastructure elements that have, or will soon, exceed their remaining useful life.
- Developing, calibrating, and utilizing the hydraulic model of the system in conjunction with GIS datasets to improve system operations and CIP development.
- Evaluating the capacity of the existing water system and identifying improvements to meet demands, including fire flow, of the current and future population.



## WATER DISTRIBUTION & WATER TREATMENT SYSTEM EVALUATION

AVOCET ENVIRONMENTAL, INC., CALIFORNIA ARMY NATIONAL GUARD, CAMP ROBERTS, CA

WSC conducted an infrastructure evaluation of the potable water supply system at the California Army National Guard Camp’s Roberts base. WSC provided specific recommendations for infrastructure improvements, operations, and maintenance to allow the system to satisfy the fluctuating demands of the base and to ensure that the primary drinking water system could cost-effectively deliver high-quality potable water to the storage system to meet its demands. The evaluation included on-site inspections and condition assessment of wells, tanks, controls, treatment, and distribution infrastructure.

### RELEVANCE TO OCSD

- Performed an infrastructure and operations evaluation of the water production and distribution system.
- Collaborated with operations staff to gain further insight into the facilities and incorporated their perspective into the assessment.
- Evaluated existing operational practices and system regulatory requirements to assist with optimizing operation and control, and ensure compliance.



## WATER MASTER PLAN

CITY OF ARROYO GRANDE, CA

WSC prepared a Water Master Plan Update and a prioritized CIP which included a capacity and condition-based assessment of the water distribution system. The project included detailed site evaluation and data collection for wells along with condition ranking of the storage tanks, pipe bridges, and pipelines. Condition information was then combined with outputs from hydraulic models of the water systems to prepare a prioritized, risk-based CIP. Developed a Routine Reservoir Maintenance Program to address current system deficiencies and to aid in the completion of future routine maintenance, and performed energy evaluations to identify energy saving solutions.

### RELEVANCE TO OCSD

- Completed a condition-based assessment and developed a risk-based CIP for the City’s water infrastructure, including pipelines, wells, pipe bridges, and storage tanks.
- Provided design and construction cost estimates for identified capital improvement projects.
- Performed a SCADA system evaluation to identify deficiencies and recommend upgrades.



## WATER MASTER PLAN

### CITY OF PISMO BEACH, CA

WSC prepared a Water Master Plan Update with a focus on developing a strong Capital Improvement Plan to support budget planning and adaptive management. The update included creating a hydraulic model consistent with the City's current GIS mapping to improve confidence in system changes and expected fire flows. WSC evaluated aging infrastructure, including booster pump stations and wells that were incorporated into the CIP. The final Master Plan provided a prioritized project list and detailed cost estimates to replace aging and inadequate infrastructure. WSC also prepared the 2015 Urban Water Management Plan at the same time to save costs which included an AWWA Water Audit.



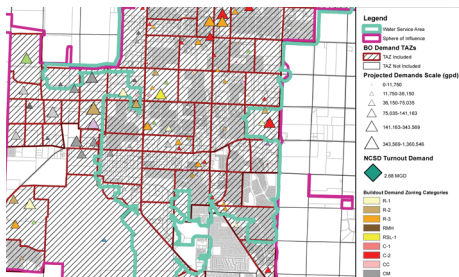
#### RELEVANCE TO OCSD

- Worked closely with the City to develop future demand estimates and buildout requirements.
- Development of a prioritized infrastructure replacement program, including booster pump stations, wells, and pipelines.
- Reviewed age and condition of assets to develop an estimate of required funding for rehabilitation and replacement of aging infrastructure.

## UTILITIES CAPACITY STUDY

### CITY OF SANTA MARIA, CA

WSC developed a water system hydraulic model in InfoWater which was loaded with parcel-specific water demand data from the utility billing system. Real-time water consumption data from the Advanced Metering Infrastructure system was used to develop diurnal demand curves for Extended Period Simulation runs. Based on the identified deficiencies, WSC developed a prioritized CIP, which allowed the City to calculate updated Growth Mitigation Fees. The CIP list included project phasing, timing, and cost estimates.



#### RELEVANCE TO OCSD

- WSC developed individual project sheets that included: descriptions, justification, risk, consequences, present value cost analysis for major alternatives, and budget impacts.
- Generated new hydraulic model of the water system from GIS shapefiles and atlas maps.
- Saved the City money by identifying deficient and incorrect data that made the old model inaccurate. WSC updated the model to avoid creating unnecessary capital projects.

## WATER MASTER PLAN & CONDITION ASSESSMENT

### BIG BEAR CITY COMMUNITY SERVICES DISTRICT, BIG BEAR, CA

WSC is currently developing the District's 2017 Water Master Plan Update. WSC conducted site visits and leveraged operator knowledge to document and address the maintenance and replacement needs of the current water system. WSC prepared detailed analysis of the District's infrastructure and conveyance system, as well as considered age and useful life. By the completion of the master plan, a comprehensive CIP will be developed that will be used to set annual budgets, establish rates and fees, prioritize improvements, and proactively prepare for the future needs of customers.



#### RELEVANCE TO OCSD

- Performing condition assessments of the District's wells, reservoirs, and booster pump stations.
- Developing a flexible evaluation toolset that will provide a defensible Rehabilitation and Replacement Plan for their water system facilities.
- WSC recommended an approach for rehabilitation and replacement of aging infrastructure, and provided capital project budget recommendations and detailed project cost opinions.

## COMPREHENSIVE PLANNING STUDY

### CALIFORNIA AMERICAN WATER COMPANY, MONTEREY, CA

WSC is developing a Comprehensive Planning Study (CPS) for California American Water’s Monterey District which includes developing recommendations for a CIP, and includes customer and demand projections, an assessment of adequacy of supplies, treatment, and distribution system facilities, and an evaluation of alternatives for developing additional supplies. WSC is performing an assessment of the distribution system piping, pumping, and storage capacity to meet current and projected demands, and to ensure it is providing adequate levels of service and reliability. The CIP is based on providing adequate capacity, meeting projected demands and growth, and meeting planning criteria and regulatory requirements.



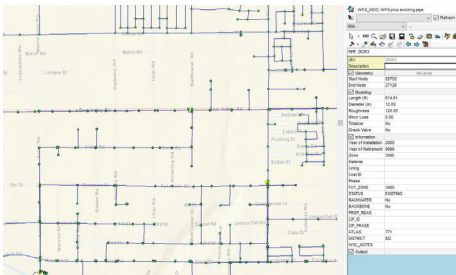
#### RELEVANCE TO OCSD

- Developing a prioritized list of operational changes that could defer, or eliminate, the need for capital improvements.
- Developing a proposed CIP that represents concept-level analysis which can be further developed during the design phase of each project.
- Identifying system hydraulic deficiencies based on pressures, velocities, headloss, and fire flow guidelines.

## WATER MASTER PLAN UPDATE

### CITY OF VICTORVILLE, CA

WSC is currently preparing a Master Plan which will address both hydraulic capacity deficiencies and rehabilitation and replacement needs driven by aging infrastructure. The Plan will present planning-level estimates of required capital spending each year based on system inventory and expected remaining useful life values. The Master Plan will result in a comprehensive 10-year Capital Improvement Plan that clearly identifies funding requirements for infrastructure upgrades. WSC will prepare a summary of expected spending needs for capacity-driven improvements and condition-driven rehabilitation and replacement.



#### RELEVANCE TO OCSD

- Using an updated hydraulic model, with a close linkage to the District’s GIS database, to identify potential capacity constraints and evaluate potential improvement alternatives.
- Collaboratively developed a comprehensive tool to determine cumulative storage capacity and water supply needs for approved and prospective projects.
- Identifying funding requirements for infrastructure upgrades.

## ON-CALL ENGINEERING SERVICES

### BIG BEAR CITY COMMUNITY SERVICES DISTRICT, BIG BEAR, CA

WSC’s responsibilities include a variety of planning, design, and project management support. WSC prepared the design plans and technical specifications for more than 12,650 LF of watermain replacement, a reservoir retrofit, and completed numerous planning documents and studies, including preparation of the 2015 Urban Water Management Plan which included an AWWA Water Audit and the Sewer Master Plan. WSC is also preparing feasibility studies, providing project life cycle support, and calculating connection fees. Other tasks included evaluating best management practices (BMPs) and preparing a Water System BMP Plan to fulfill regulatory requirements.



#### RELEVANCE TO OCSD

- Serving as a technical advisor for various planning and engineering related issues and attends Board and stakeholder meetings on behalf of the District.
- Performing design and construction services for implementation of the CIP, and providing in-depth review of plans and specifications.
- Provided capital project budget recommendations and detailed project cost opinions as part of a comprehensive CIP.



## WATER SYSTEM IMPROVEMENTS

### BIG BEAR LAKE DEPARTMENT OF WATER AND POWER, BIG BEAR LAKE, CA

Since 2010, WSC has helped Big Bear Lake Department of Water and Power (BBLDWP) implement nearly \$18M in infrastructure improvement projects. WSC is completed the design and managed the construction of a 1MG reservoir, two pumping plants, well equipping, and more than 14,000 LF of water pipeline. WSC prepared Preliminary Engineering Reports, provided lifecycle cost estimates, and/or developed site layouts for multiple well projects. WSC also managed the design and construction of a wellhead treatment system. For the Arrastre Creek Well project, WSC designed the pumping plant under a rigorous schedule which was possible due to our knowledge of the pressure zone.



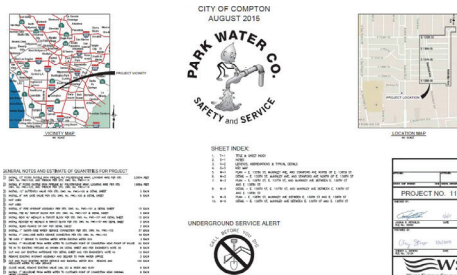
#### RELEVANCE TO OCSD

- Provided funding and financing support which included assistance in acquiring and complying with more than \$4.8M in grant funding and \$11.4M in low interest loans.
- Managed several projects through planning, design, construction, start-up and commissioning.
- Familiarity with staff and infrastructure enabled streamlined communication and efficient project delivery.

## WATERLINE DESIGN PROJECTS

### LIBERTY UTILITIES, MULTIPLE LOCATIONS, CA

WSC developed a CIP for the water system based on the evaluation of multiple alternatives to improve the capability and reliability of the Bell Mountain and Stoddard zones. WSC designed multiple pipeline replacement projects which included replacement of aging and leaking lines located in inaccessible backyard easements and installation of approximately 30,000 feet of new 8-inch and 12-inch lines. WSC embraced and applied Liberty Utilities' expectations and design standards that resulted in the frequency of design reviews to be reduced to only occur at the 90% and 100% submittals. WSC also prepared an evaluation report for an additional storage reservoir and booster station in the Compton East system which included developing life cycle costs.



#### RELEVANCE TO OCSD

- Designed facilities to minimize service interruptions during construction to maintain service to customers.
- Completed multiple projects on budget and under a tight project schedule by creating high quality initial design documents.
- Utilized existing hydraulic models and SCADA, as well as estimated the feasibility and cost of the alternatives.

## STORMWATER MANAGEMENT TO OPTIMIZE GROUNDWATER RECHARGE

### FORT ORD REUSE AUTHORITY, COUNTY OF MONTEREY

Balance led stormwater management and design efforts for the base conversion process overseen by the Fort Ord Reuse Authority (FORA) in coastal Monterey. FORA guidelines limit impacts to the regionally significant aquifer that underlies the base and promote a sustainable development framework that emphasizes use of existing structures within a high-density residential setting. Balance developed the Stormwater Management Plan (SWMP) for a 244-acre residential mixed-use "new urbanism" project. The SWMP addressed issues from peak flow controls to best management practices and groundwater recharge with multi-purpose stormwater basins.



#### RELEVANCE TO OCSD

- Creative use of limited space, the basins were incorporated into park areas and were designed with the capacity to infiltrate all runoff to and including the 100-year design storm.
- Very high levels of new impervious cover and space limitations led to the planning and design of an extensive system of underground recharge facilities with explicit consideration of factors such as variability and sustainability of percolation rates, capital cost, and maintenance access and protocols.

# REFERENCES

The following references demonstrate WSC's ability to provide the services included within the scope of specifications. OCSD may contact each of the references listed for additional information regarding WSC's qualifications.

<b>CLIENT NAME</b>	City of Pismo Beach
<b>CONTACT INDIVIDUAL</b>	Mr. Benjamin Fine, PE, Public Works Director / City Engineer
<b>TELEPHONE &amp; EMAIL</b>	(805) 773-7037   bfine@pismo beach.org
<b>DATE OF SERVICE</b>	2012-present
<b>DESCRIPTION OF SERVICES</b>	<p>WSC is currently the Program Manager and Design Engineer for the Regional Groundwater Sustainability Project, an Indirect Potable Reuse project that will provide purified water to recharge the Santa Maria Groundwater Basin. WSC worked on the City's Water Master Plan Update and completed their 2015 Urban Water Management Plan. WSC completed the design for their 2014 Water Main Replacement Program, development of the Recycled Water Facilities Planning Study, and preparation of a well condition assessment. Additionally, WSC also served as the design engineer for the Five Cities Lift Station Replacement Project and WWTP Sludge Dewatering Improvements project which included significant elements of conveyance infrastructure design. WSC is also conducting construction management services for both the Five Cities Lift Station and WWTP Sludge Dewatering Improvements, as well as for the maintenance of six lift stations.</p>

<b>CLIENT NAME</b>	Big Bear Lake Department of Water and Power
<b>CONTACT INDIVIDUAL</b>	Mr. Reginald Lamson, PE, PLS, General Manager
<b>TELEPHONE &amp; EMAIL</b>	(909) 866-5050, ext. 201   rlamson@citybigbearlake.com
<b>DATE OF SERVICE</b>	2009-present
<b>DESCRIPTION OF SERVICES</b>	<p>WSC has been providing engineering services to Big Bear Lake Department of Water and Power (BBLDWP) since 2009. WSC designed a well, booster pump station, 17,500 LF of transmission main, a 1 MG reservoir, multiple CMU buildings, and an access road. WSC recently updated BBLDWP's Atlas Maps by converting their existing AutoCAD based Atlas Maps into GIS database. Additionally, WSC recently completed the design of the Sawmill Well Pumping Plant and is currently providing construction management services. WSC also assisted BBLDWP to identify funding sources and prepared USDA and USEPA application packages which resulted in nearly \$17M in grant funding and low interest loans and continues to provide BBLDWP funding and financing administration and support services. In addition, WSC managed the construction of more than 36,000 LF of pipeline, the drilling of two wells, and the equipping of five wells.</p>

<b>CLIENT NAME</b>	Big Bear City Community Services District
<b>CONTACT INDIVIDUAL</b>	Mr. Jerry Griffith, Water Department Superintendent
<b>TELEPHONE &amp; EMAIL</b>	(909) 584-4008   jgriffith@bbccsd.org
<b>DATE OF SERVICE</b>	2014-present
<b>DESCRIPTION OF SERVICES</b>	WSC provides on-call engineering services to Big Bear City Community Services District (BCCSD) and has completed, or is in the process of completing, multiple projects, including: the design and construction management services for the Peter Pan Area and Sheridan Drive Water Main Replacements, developing the 2015 Urban Water Master Plan, and multiple sewer replacement projects. During the preliminary design phase of the Peter Pan Area and Sheridan Drive projects, WSC designed 12,650 LF of water main, within the street right of way. WSC is currently developing a Water Master Plan which includes developing a comprehensive CIP to set annual budgets, establish rates and fees, prioritize improvements, and proactively prepare for the future needs of customers.

<b>CLIENT NAME</b>	California American Water
<b>CONTACT INDIVIDUAL</b>	Mr. Richard Svindland, PE, President
<b>TELEPHONE &amp; EMAIL</b>	(916) 568-4296   richard.svindland@amwater.com
<b>DATE OF SERVICE</b>	2007-present
<b>DESCRIPTION OF SERVICES</b>	California American Water (CAW) has turned to WSC to support their infrastructure improvement projects and planning efforts throughout California since 2007. WSC has assisted CAW in their rate cases and prepared their 2005, 2010, and 2015 Urban Water Management Plans for all five districts. WSC inspected a large meter retrofit program for their Sacramento District and assisted with construction administration for the rehabilitation of six above ground steel tank projects. WSC was also CAW's Program and Construction Manager for the removal of the largest dam removal in California history, the \$85M San Clemente Dam. WSC has been providing project management, construction administration, and design support in the Ventura District, including the replacement of two booster stations, four reservoirs, and pipeline installation to connect a water supply turnout to their system. WSC also completed an energy use and optimization study for CAW's Sacramento and Monterey Districts, and is currently completing the Comprehensive Planning Study for their Monterey District.

# PROJECT UNDERSTANDING

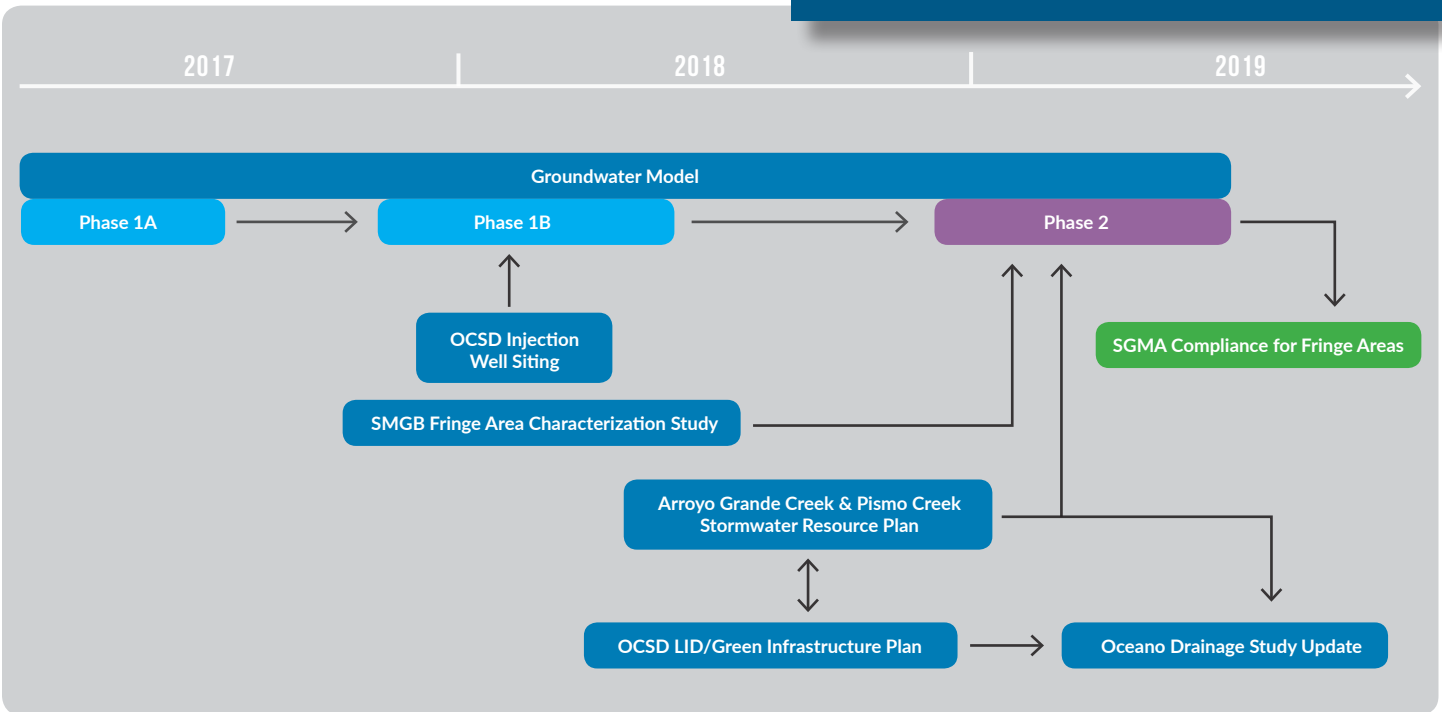
The Oceano Community Services District (OCSD) is responsible for providing water, wastewater collection, street lighting, solid waste management, fire protection and parks and recreation services for the community of Oceano. To ensure its customers a reliable water supply, OCSD has invested in developing a robust and diversified water supply portfolio which includes water from the underlying Santa Maria Groundwater Basin, Lopez Reservoir, and the State Water Project. Having secured sufficient water supply for future growth, OCSD is now shifting its focus to addressing capacity and condition based deficiencies and deferred infrastructure replacement within its water distribution system.

In 2009, OCSD completed a Master Plan and hydraulic evaluation of its water distribution system that identified capacity deficient areas, as well as prioritized recommendations for piping and other facility upgrades to improve fire flow capacity. While the projects identified in the 2009 Master Plan will help OCSD address capacity limitation, they do not account for the aging infrastructure in OCSD’s water system. To assist OCSD in preparing a more comprehensive Capital Improvement Program (CIP) that includes both capacity and condition based recommendations, OCSD is looking to leverage grant and other funding sources to prepare a Water Resources Reliability Program (WRRP).

OCSD envisions a phased implementation for the WRRP, that will utilize a portfolio of funding sources to cover costs for individual project phases. For the planning portion of the WRRP, or Phase 1, OCSD intends to utilize Proposition (Prop) 84 funds obtained for a Recycled Water Injection Well Site Plan, a Low Impact Development (LID) plan, and a Leak Detection and Management Plan. Phase 1 will result in a prioritized and comprehensive CIP for OCSD’s water system. OCSD then intends to utilize Prop 1 Disadvantaged Community (DAC) engagement funds to conduct preconstruction activities, including design, environmental compliance, and other technical assistance for specific, high-priority projects that are identified in the water system, Phase 2 of the WRRP. Phase 3 will include construction of the projects that are designed in Phase 2.

While the original Prop 84 Grant Application included budget for a Leak Detection Program, recent leak investigations completed by Rural Water Association did not identify any significant leaks which indicates that additional leak detection is likely not best use of available grant funds. Therefore, based on our understanding of OCSD’s needs and conversations with OCSD staff, WSC is proposing to modify the Phase 1 Water Resources Reliability Program to include the following primary elements.

**WSC and its subconsultant team are integrally involved in many of the related water resources projects in southern San Luis Obispo County and will utilize our roles and relationship on those projects to maximize the value of OCSD’s Water Resources Reliability Plan efforts.**



**Water System Management Toolsets** – OCSD is interested in modernizing their management systems and is seeking support from a consultant teammate to assist OCSD to get these toolsets updated and in place to allow OCSD to proactively and efficiently manage their water system.

**Condition Based Assessment** – To complement the existing capacity based CIP, OCSD is looking for a condition based assessment of its water system infrastructure to assist in identifying infrastructure elements that have, or will soon, exceed their Remaining Useful Life (RUL).

**Comprehensive CIP** – To identify the highest priority projects and assist OCSD in focusing its limited resources on addressing the system’s most critical needs, OCSD needs a comprehensive CIP that incorporates both capacity and condition based criteria.

**Groundwater Recharge Enhancement** – To improve reliability of its threatened groundwater supply, OCSD is looking to investigate potential opportunities to enhance groundwater recharge. These opportunities include siting of injection wells for the Regional Groundwater Sustainability Project (RGSP) and evaluation of the potential to incorporate LID elements into the County’s updated drainage study for the Oceano area.

WSC and our team of specialized subconsultants are well equipped to assist OCSD in completing each of the Phase 1 WRRP elements described above. Additionally, WSC’s work with other local clients and programs puts us in an ideal position to allow OCSD to leverage ongoing related water resource initiatives (e.g. Regional Groundwater Sustainability Project, Five Cities/ SLO County Stormwater Resources Plan, Santa Maria Groundwater Basin SGMA compliance, etc.) Our proposed approach for each of these elements is described in the following section.

## PROJECT APPROACH

WSC developed the following approach for the WRRP to assist OCSD in best utilizing the available grant funding to identify and prioritize deficiencies, develop an updated CIP, and advance effort to improve groundwater recharge in the Santa Maria Groundwater Basin.

### Effective Water System Operation Requires Industry Standard Data Management Systems

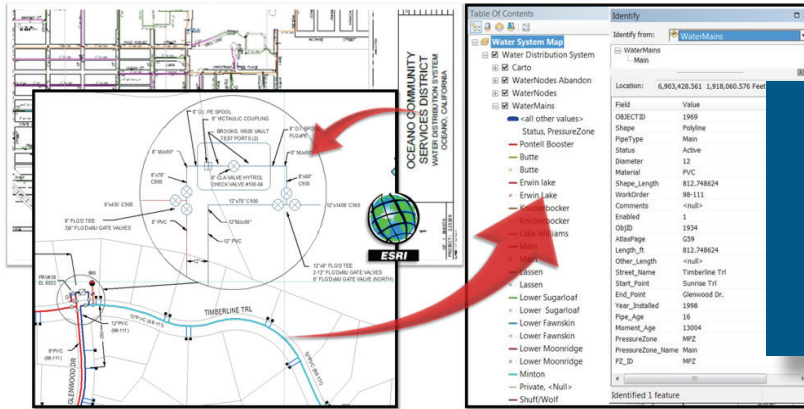
For OCSD to effectively address its water system deficiencies and proactively manage distribution system assets, it must first develop systems to inventory and prioritize assets. WSC proposes to assist OCSD in developing the following systems, which will not only be utilized to develop the WRRP, but will also be effective tools for ongoing maintenance and operations.

### GIS Provides a Platform for Water System Management

Management of any water system requires a data management structure that can be utilized to identify and track each of the numerous critical system assets. While OCSD maintains an Atlas for its water system, it does not have the ability to tie maintenance and other records directly to system assets. To assist OCSD in the transition to a platform that allows for comprehensive asset management, WSC’s team, which includes EMS, a highly cost-effective GIS dataset development team, will create a GIS dataset with readily accessible data (e.g. Material, Construction Date, Diameter, etc.) for all OCSD assets shown in the existing atlas. Once developed, the water system database will allow OCSD to track the following additional relevant attribute data for other water system infrastructure elements.

DISTRIBUTION SYSTEMS ASSET	GIS ATTRIBUTE DATA
Pipelines	Material, Construction Date, Diameter, Break History, Hydraulic Criticality
Tanks	Material, Construction Date, Volume, Maintenance History, Water Quality
Valves	Valve Type, Exercising History
Sampling Station	Water Quality
Hydrants	Construction Date, Maintenance History, Flushing Records

Developing and maintaining a GIS dataset will provide OCSD with easy access to maintenance, and other tracked records, for each asset and allow for efficient review, analysis and a geographical presentation of the system.



WSC will work with Engineering Mapping Solutions to cost effectively convert OCSD's Atlas Maps to GIS and provide OCSD with a platform for managing all of the assets in its water distribution system.

### Proactive Maintenance is Critical for Reliable Distribution System Operations

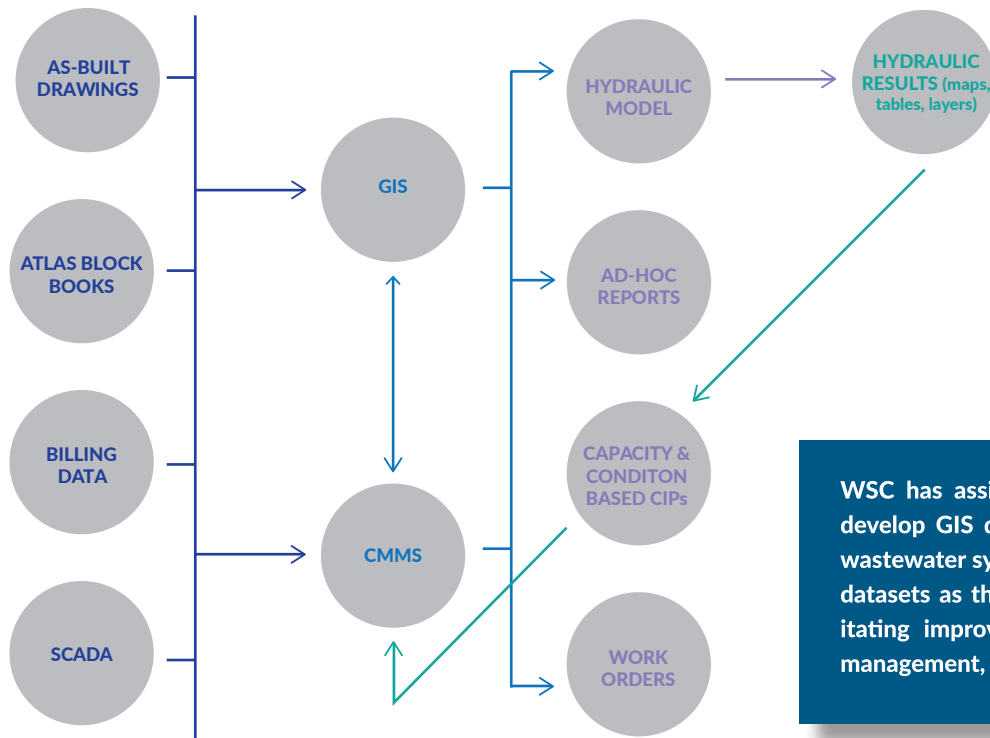
Given the extensive number of individual assets in any water distribution system, ensuring proper preventative maintenance can be a significant challenge without a defined maintenance plan and the support of a Computerized Maintenance Management System (CMMS) or Enterprise Asset Management software platform (EAM). WSC proposes to review OCSD's existing asset and maintenance management systems and develop recommendations on potential opportunities to implement a CMMS or EAM system. This will assist OCSD in proactively managing its distribution system maintenance. CMMS or EAM systems will allow OCSD to set maintenance reminders for the following, but not limited to, preventative maintenance activities:

- Tank inspection, cleaning, coating
- Pump & electrical maintenance & testing
- Above ground pipe & appurtenance coatings
- Fire hydrant painting & air valve maintenance
- PRV & check valve maintenance
- Isolation valve exercising
- Dead-end flushing
- Well testing

Typically, these managements systems are tied to the GIS datasets and would allow OCSD to establish maintenance intervals for individual assets, create automated work orders, track maintenance progress, and run individual asset or system wide reports. However, given OCSD's size and number of staff, identifying

a "right sized" solution is critical for system adoption and success. To determine if a CMMS or EAM system would be a good fit for OCSD, WSC proposes to work with OCSD Staff to identify critical needs, coordinate with system vendors, and provide OCSD with a recommendation on which system would support the most effective approach for managing distribution system maintenance.

WSC has assisted numerous agencies to develop GIS datasets for their water and wastewater systems and has utilized these datasets as the central database for facilitating improved system operations and management, as well as CIP development.


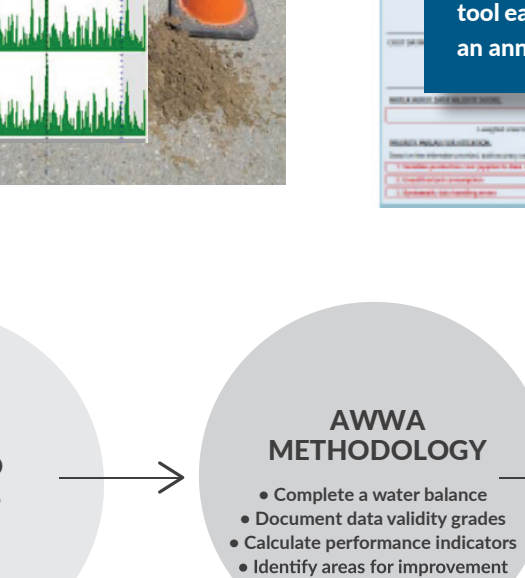


## Industry Standard Water Accounting Framework Provides Template for Identifying Source of Water Loss

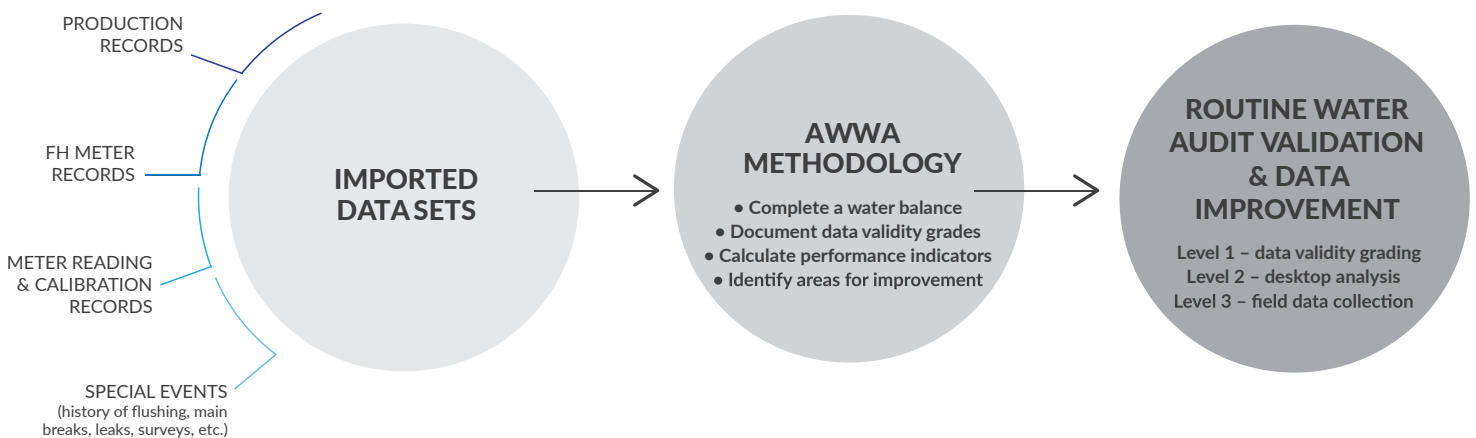
High, unaccounted for water can significantly impact water fund balances and OCSD is concerned that water loss in the distribution system is increasing water system operating costs and may impact their eligibility for water efficiency grant opportunities. It was initially thought that leaks from OCSD's large water mains were the culprit for much of the water loss, however, a recent Leak Detection Survey, completed by the California Rural Water Association, surveyed approximately 10% of OCSD's larger, non-metallic pipelines and did not find any significant leaks.

Based on the results of the leak detection survey, improved water accounting following meter replacements and conversations with OCSD staff, WSC does not recommend additional leak detection testing at this time. It is OCSD's understanding that most of the pipeline leaks are on the smaller diameter, metallic pipelines that are already identified for replacement in the 2009 Master Plan. Alternatively, WSC proposes to assist OCSD in identifying other effective strategies for reducing non-revenue water loss, including utilizing the American Water Works Association's (AWWA) Free Water Audit Software. Utilization of this software platform on an annual basis is now mandatory for all water agencies with over 3,000 connections or 3,000 Acre-Feet per Year of Demand. Transitioning OCSD to this platform will bring it up to current industry standards for water loss accounting and will assist OCSD in prioritizing measures to improve water system accounting and reduce water loss.

**Based on the results of the 2017 Leak Detection Survey and conversation with OCSD staff, WSC recommends that OCSD focus its water loss evaluation efforts by performing a more detailed system-wide water audit and not additional leak detection.**

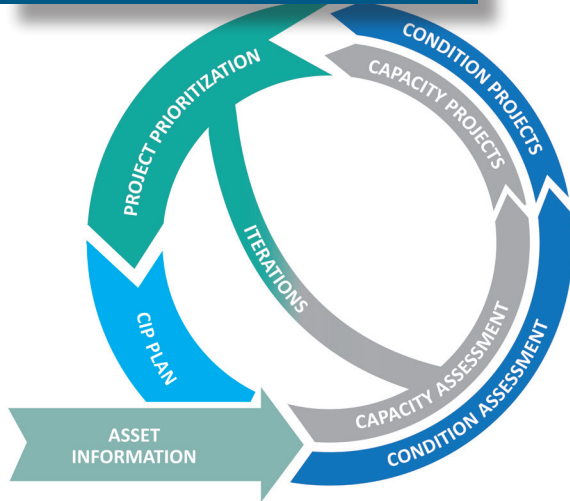
**WSC has developed, assisted in development, and/or reviewed over 20 AWWA Water Audits as part of the development of 2015 Urban Water Management Plans throughout the State. OCSD to be able to use the AWWA Water Audit tool easily and effectively evaluate water loss on an annual basis.**



## OCSD Requires a Comprehensive CIP to Best Utilize its Limited Financial Resources

OCSD's current CIP is primarily focused on projects to address capacity deficiencies identified in the 2009 Master Plan, and the cost estimates for those projects are outdated. To assist OCSD in better understanding the current cost to upgrade and maintain the distribution system, WSC is proposing to complete a condition based assessment of the water system assets and develop a CIP that addresses capacity and condition deficiencies to help OCSD prioritize the utilization of its financial resources.

During the development of the comprehensive CIP, WSC will create the tools OCSD needs to monitor, predict and prepare future CIP projects to address future condition and capacity deficiencies.

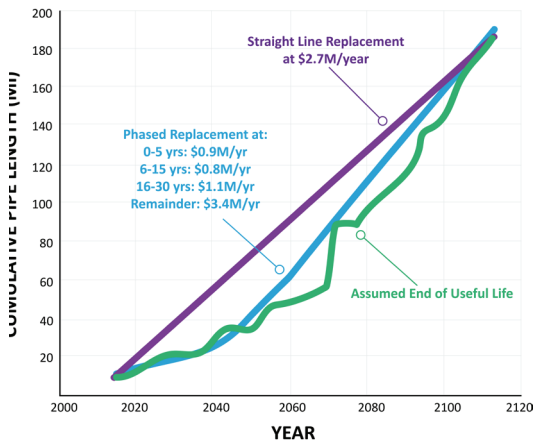


### Condition Based Assessment Provides OCSD with a Window into the Future

Although OCSD staff have a strong intuitive grasp on the upcoming needs and trends of the distribution system, there is not a simple system in place to convey this understanding to the public, board members, regulatory agencies, or funding opportunities. Performing a rigorous condition based assessment will provide estimates of when specific assets have reached the end of their useful life and are ready for replacement prior to failure. Understanding when large groups of assets are reaching the end of their useful life allows OCSD to prepare long-range budgets that include the cost of rehabilitation and/or replacement so that OCSD can mitigate the risk of asset failure.

Estimates of remaining useful life (RUL) are primarily based on asset age and material, but should also include utility-specific information such as operator experience and leak/break history. This information can be utilized to identify material or geographic specific trends and create useful graphics and/or reports to convey the need for infrastructure replacement to OCSD's customers. RUL estimates are also critical for

developing future CIP budget requirements and will allow OCSD to project its infrastructure funding needs for the next 10 years, 20 years, and beyond. By incorporating condition assessment into the CIP development process, OCSD will be able to enter Phase 2 of the WRRP with confidence that it is making investments to address the most critical needs.



Pipe Material	Estimated Useful Lifetime (years)		Asset	Estimated Life (years)
	Low value	High value		
Cast iron	50	75	Transmission Mains	60-110
PVC	75	100	Distribution Pipelines	60-110
Asbestos Cement	70	90	PVC Well Casing	100
Ductile Iron	75	100	Well Electrical System	30-40
Steel	40	60	Well Pump and Motor	10-15
Galvanized iron	40	60	Pump stations (not including pumps, motors, or electrical)	60
PE	40	60	Electrical and Control Facilities at BPS and Storage Tanks	20
HDPE	80	110	Pumps and Motors	15-20
			Welded Steel Storage Tanks (except coatings)	30-60
			Tank Coatings	12
				0+

For the City of Paso Robles Water Master Plan Update, WSC develop infrastructure replacement curves to provide the City with estimates of required infrastructure investment to aid in future budget development and rate setting.

Initial evaluation of OCSD's distribution system identified that the oldest pipelines in the system appear to be ACP and Steel. While ACP pipelines have a relatively long useful life, the steel lines are approaching or have exceeded their remaining useful life.

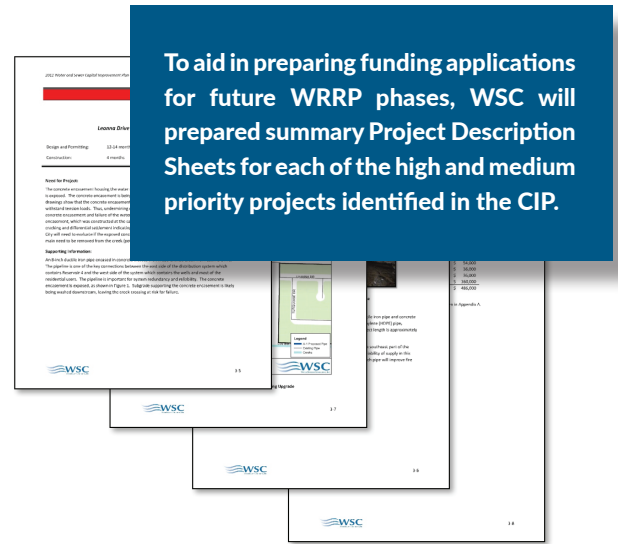


## Project Description Sheets Prepare OCSD for Funding Applications

When pursuing outside funding, the funding agencies are always looking for a concise summary of the proposed project to include in the application. To help prepare OCSD for pursuing funding for Phase 2 and 3 of the WRRP, WSC will prepare Project Description Sheets for each of the high and medium priority projects that are identified in the final CIP. These sheets can then be readily added to future funding applications and provide the funding agency with the necessary information regarding the project, including the need for the project, project costs and implementation timeframes.

## Groundwater Recharge Enhancement Improves Regional Water Supply Reliability

Groundwater from the Santa Maria Groundwater Basin is an important component of OCSD's water supply portfolio, however, the basin is at risk of seawater intrusion. To protect the basin from further degradation, OCSD, and its Northern Cities Management Area partners, have identified groundwater recharge as a critical component. To improve groundwater sustainability, OCSD is investigating potential opportunities for improved stormwater capture and percolation, as well as the potential for siting injection wells for the Regional Groundwater Sustainability Project within its service area. WSC's approach to investigating both of these opportunities is described in the subsequent sections. Additionally, to maximize the benefits of the groundwater recharge enhancement initiatives, the WSC team will closely coordinate these activities with related water resources projects, including but not limited to, the Five Cities/SLO County Stormwater Resources Plan, the RGSP Phase 1B Groundwater Model, and the Arroyo Grande Habitat Conservation Plan.



## Green Infrastructure Evaluation Helps Identify Multi-Benefit Projects

Given the high infiltration rate of the soils underlying OCSD's service area, stormwater conveyance and capture infrastructure was not incorporated throughout the community of Oceano. As urbanization progressed and impervious surfaces increased, the potential for infiltration or recharge of runoff decreased, leading to localized flooding throughout the service area during wet weather events. In 2004, the San Luis Obispo County Flood Control and Water Conservation District (County) prepared a Drainage and Flood Control Study for the community of Oceano. This study assessed drainage and flooding issues and proposed an array of capital improvement projects aimed at mitigating residential flooding, as well as flooding at Highway 1. WSC understands that OCSD would like to build off these prior work efforts and assess groundwater recharge potential using modern Low Impact Development (LID) techniques.

Low Impact Development includes a variety of practices that mimic or preserve natural drainage processes to manage stormwater, improve water quality, and reduce runoff and flooding while providing the aesthetic benefits of added vegetation to otherwise impervious landscapes. These practices are designed to retain stormwater runoff and promote infiltration and recharge of groundwater basins. The United States Environmental Protection Agency (EPA) currently refers to these practices as Green Infrastructure. This term is often used interchangeably with Low Impact Design, as it incorporates many of the same stormwater management practices, but is intended to extend beyond just land development or re-development projects. WSC is recommending that the term Green Infrastructure be used throughout the WRRP as we believe it will better position OCSD and the County for potential funding opportunities such as the Proposition 1 Storm Water Grant Program or Senate Bill No. 5.



The primary objective of the Green Infrastructure evaluation is to identify the opportunities and constraints associated with the implementation of Green Infrastructure projects within OCSD's service area. The work will be focused on identifying locations where Green Infrastructure projects can be implemented to maximize groundwater recharge and reduce flooding. The WSC team will carry out a comprehensive evaluation, that includes evaluating existing infiltration facilities and how they might be improved, identifying potential locations for new Green Infrastructure, quantifying overall recharge potential in terms of additional water supply, and assessing the potential for Green Infrastructure to alleviate known flooding problems.

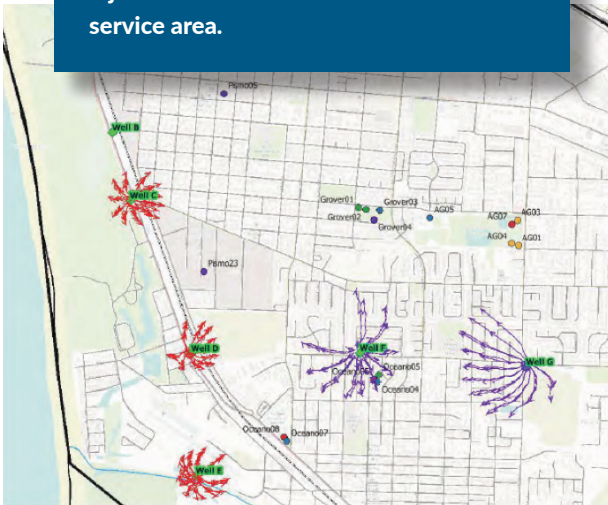
The findings of the evaluation will be summarized in a Green Infrastructure Plan (Plan) specifically tailored to the conditions and issues within OCSD's service area. This Plan will identify up to three priority projects that have the greatest potential impact in terms of groundwater recharge and flood reduction. The location, size, quantified benefits, and anticipated costs associated with these priority projects will be summarized in Project Description Sheets that can readily be used as the basis of discussions with other agencies and to support future funding applications. With respect to Oceano, supporting documentation for funding applications is particularly of interest since increased funding will likely be available for Disadvantaged Communities (DACs) in the upcoming years and having specific, actionable projects within the context of an overarching Plan is often critical in successfully competing for grant and/or program funding.

### OCSD Injection Well Siting Expedites RGSP Injection Well Design

OCSD is interested in supporting its RGSP partners by evaluating potential injection well locations in OCSD service area to serve as part of the injection well network for the RGSP. WSC and Cleath-Harris Geologists performed outreach to property owners and completed the preliminary evaluation of potential injection well locations for the first phase of the RGSP

groundwater model and will leverage that experience and toolsets to evaluate the proposed injection well locations proposed by OCSD. We will also work closely with the Geoscience Support Services, Inc., the hydrogeologist firm completing the following phase of the groundwater model, to ensure effective coordination. It is envisioned that Cleath-Harris Geologists' injection well site investigation efforts will feed directly into Geoscience's RGSP modeling and that having pre-vetted injection well locations will streamline the RGSP well field development.

WSC and Cleath-Harris Geologist have completed all of the previous work to identify locations and model potential injections well sites for the RGSP and can leverage that effort, and previously developed toolsets, to evaluate potential injection well locations in the District's service area.



# SCOPE OF WORK

## TASK 0.0 PROJECT MANAGEMENT

### 0.1 Project Meetings

- Conduct five (5) periodic one and a half (1.5) hour project meetings to: provide updates on project progress; present interim results; review the data request log; discuss project methodologies; and review draft and final deliverables. It is anticipated that the following project meetings will be required to complete the Water Resource Reliability Plan. Whenever possible, meetings will be combined to increase project efficiency.
  - » Kick-Off/Data Review Meeting
  - » Groundwater Recharge Enhancement Meeting
  - » Distribution Assessment Meeting
  - » IP Development Review Meeting
  - » Draft WRRP Review Meeting

**Deliverable:** *An agenda provided to OCSD at least two days before the meeting. A list of action items and assignments will be provided within one week following the meeting.*

### 0.2 Status Update Conference Calls

- Conduct monthly status update conference calls with OCSD's Project Manager. It is assumed that conference calls will last approximately 1 hour.

### 0.3 Project Schedule

- Update the project schedule as needed. Maintain a log of the action items and key project decisions made throughout the duration of the project.

**Deliverable:** *An updated action item / key decision log.*

### 0.4 QA/QC

- Perform comprehensive quality control of all work items being prepared for delivery to OCSD.

### 0.5 Project Controls

- Provide oversight, manage communication, assign resources, and coordinate work efforts of the Consultant Team to align with the WRRP priorities and achieve cost-effective performance.
- Administer subcontracts.
- Prepare and submit monthly invoices and progress reports that include a summary of activities completed in the previous month.

**Deliverable:** *Monthly invoices and progress reports.*

## TASK 1.0 DATA COLLECTION & REVIEW

### 1.1 Data Request

- Prepare a data request log to track data sets requested from OCSD. The data request will include the existing Water Master Plan and OCSD maps and records for the water system.
- Maintain the data request log as items are provided by OCSD or new items are identified.

**Deliverable:** *An updated data request log.*

### 1.2 Data Review

- Review existing data to evaluate its use for the WRRP. Identify any missing data that needs to be generated to support the WRRP. Work with OCSD staff to develop a plan for population of any missing data.

**Deliverable:** *A summary of existing data sets and any identified data gaps.*

## TASK 2.0 WATER SYSTEM MANAGEMENT ASSISTANCE

### 2.1 GIS Development

- Convert existing AutoCAD or hardcopy Atlas Maps into a GIS Database. GIS features will include line and point features for the following distribution system elements: water lines, wells, hydrants, valves, and tank. The following attribute data available from the Atlas Maps will be included in the GIS database: pipeline diameter, material and year installed, hydrant and valve IDs (where available), and additional cartographic and Right of Way (ROW) features.

### 2.2 Water Audit

- Collaborate with OCSD staff to prepare the AWWA Water Audit. WSC will compile the core information to complete the audit, but OCSD staff will need to grade data quality per AWWA's criteria using AWWA Water Audit software and the M36 Water Audits and Loss Control Programs Manual. WSC will work with OCSD staff to determine a protocol for future updates of the audit. This collaborative effort will require OCSD staff to review and grade OCSD's data quality to benchmark for future data validity improvements per the guidance of the California-Nevada Section AWWA Water Loss Technical Assistance Program (Water Loss TAP).
- Provide OCSD with instructions on how to perform future AWWA Water Loss Audits.

### 2.3 Water System Maintenance Evaluation

- Evaluate OCSDs existing maintenance practices, service intervals, and maintenance data tracking systems. Based on the results of the evaluation, WSC will develop recommendations for routine water system infrastructure maintenance and summarize these recommendations in a table/narrative format.

**Deliverable: Water system infrastructure maintenance recommendations.**

### 2.4 CMMS Evaluation & Support

- Provide support for the implementation of a Computerized Maintenance Management System (CMMS) to allow OCSD to better manage water system assets. This will include research and evaluation of up to three (3) CMMS software platforms, participating in CMMS platform demonstrations, and development of recommendations for CMMS implementation. WSC has budgeted 60 hours to support OCSD in implementation and start-up for the selected CMMS platform.

## TASK 3.0 CAPACITY BASED ASSESSMENT

### 3.1 Review Existing Capacity CIP

- Review and summarize capacity deficiencies and associate upgrade projects identified in the 2009 Master Plan (Master Plan). Coordinate with OCSD staff to discuss proposed projects and gather input on which projects have been completed, are not necessary, or were not included in the Master Plan but are necessary.

### 3.2 Updated CIP Cost Estimates

- Prepare updated cost estimates for the CIP projects identified in the Master Plan. CIP project costs provided in the Master Plan will be updated using the Engineering News-Record Construction Cost Index and engineer's judgement based on recent bids for local water system construction projects.

## TASK 4.0 CONDITION BASED ASSESSMENT

### 4.1 Condition Based Data Review

- Review available information about system age and condition of distribution system assets.

### 4.2 WSC Field Visits

- Spend one (1) day with OCSD staff to perform an evaluation of visible and accessible facilities that will include documenting current status of the equipment, such as: noting the subjective condition, age (when available), operational status, adequacy to perform required function, need for replacement, and size/rating/diameter/capacity.
- Develop summary datasheets for each key facility (e.g. wells, tanks, etc.) that document the findings from the field visit.

**Deliverable: Summary data sheets documenting condition and status of key water system infrastructure.**

#### 4.3 Condition Based Improvement Planning

- Develop estimates of remaining useful life and preliminary replacement schedule based on installation date, material type, and industry standards. Develop cost estimates to replace or rehabilitate infrastructure once it approaches or exceeds estimated remaining useful life. Develop replacement curves to provide a preliminary estimate of required funding for rehabilitation and replacement of aging infrastructure.

### TASK 5.0 CIP DEVELOPMENT

#### 5.1 Preliminary Project List

- Develop a preliminary list of projects that includes projects to address both capacity and condition based water system deficiencies. Project prioritization will be based upon several criteria that will account for capacity and condition deficiencies and risk or consequence of failure factors. Prioritize improvements based on what planning horizon they are needed for (existing, 3-year, 10-year).

#### 5.2 Project Description Sheets

- Review preliminary project list with OCSD staff and update project list based on OCSD staff input. Develop a fact sheet for each recommended improvement project that includes a brief project description, estimated cost, and priority.

### TASK 6.0 WATER RESOURCE RELIABILITY PROGRAM REPORT

#### 6.1 WRRP Report

- Combine documents from previous tasks into a draft WRRP for OCSD review. Prepare exhibits showing proposed improvements to accompany WRRP. Prepare an executive summary describing the findings and the recommended improvements. Update the WRRP based on OCSD staff input and prepare a final WRRP.

***Deliverable: Draft and Final WRRP.***

#### 6.2 BOD Presentation

- Prepare presentation about the WRRP and deliver them at a public Board of Director's meeting. Incorporate feedback received into the final WRRP.

### TASK 7.0 REAL PROPERTY APPRAISAL

#### 7.1 Real Property Appraisal

- Provide Real Property Appraisal services as required to support OCSD property acquisition. Due to the unknown level of effort required for Real Property Appraisal, WSC included budget of up to \$9,500 to support OCSD.

### TASK 8.0 LID/GREEN INFRASTRUCTURE EVALUATION

#### 8.1 Data Collection & Field Visits

- Collect and review background data including but not limited to:
  - » Published geologic and soils map to identify naturally permeable zones;
  - » Information on groundwater elevations and their variability by location and season;
  - » Land cover, land use, and ownership information;
  - » Existing specialist reports, data, and regulations.
- Conduct field visits to collect site-specific information relating to drainage infrastructure and local hydrologic parameters. Coordinate visits with OCSD and County staff to better understand first-hand any performance and maintenance issues with existing facilities and confirm where stormwater runoff is currently most problematic.

## 8.2 Existing & New Facility Opportunity Assessment

- Assess the overall performance of the nine (9) existing stormwater infiltration facilities identified in the County's 2004 Flood Control Study, with consideration to the size, contributing drainage area, land use characteristics, and any noted performance issues. Emphasis will be placed on benchmarking drainage area to facility size ratios that are known to work effectively and to identify facilities that are not operating to their full potential for infiltration and groundwater recharge.
- Evaluate retrofits of facilities not currently maximizing recharge. Retrofits can range from addressing deferred maintenance to physical reconfiguration (adding surface area, increasing ponding depth, etc.) to drainage enhancements to capture additional runoff.
- Assess the potential for Green Infrastructure facilities where OCSD service area is currently lacking extensive stormwater infrastructure and where existing flooding problems are indicative of uncaptured recharge potential. Potential infiltration basins identified in the County's 2004 Study will be reviewed and ranked along with other sites. Focus will be placed on publicly-owned parcels and public rights-of-way with primary considerations including soil characteristics, contributing drainage areas, depth to groundwater, and severity and frequency of localized flooding.
- Coordinate with County staff to identify anticipated near- to mid-term development proposals where recharge enhancements, such as "green streets," can often be realized at relatively low marginal cost.

## 8.3 Recharge Potential & Flood Reduction Quantification

- Generate a range of observed recharge rates within the service area, based on available data, and quantify the potential for the priority project sites to provide recharge in terms of anticipated acre-feet/year.
- Hydrologic modeling to assess recharge over a range of water year types so that long-term averages can be identified and the impact of annual variability is included. Modeling results will be used directly to inform ranking of preferred approaches and specific priority project sites.
- Quantify the flood reduction potential of Green Infrastructure following the methodology set forth in the National Oceanic and Atmospheric Administration's 2015 Guide to Assessing Green Infrastructure Costs and Benefits for Flood Reduction, with an emphasis on identifying project sites that reduce local flooding depths over the greatest area possible.

## 8.4 Green Infrastructure Plan

- Prepare recommendations that focus on areas that maximize the goals and objectives of OCSD. If warranted, a list of special considerations for individual projects will be developed (such as access constraints, owner interest, and linkages to other existing or planned facilities) to further direct future implementation of projects.
- Prepare 'Project Description Sheets' for up to three (3) high-priority projects. Project Sheets will show conceptual illustrations, maps, photos, and similar graphical elements, as well as descriptions of the anticipated benefits that could result from each high-priority project. Benefits will be presented in terms of annual volume of recharge potential and flood reduction potential both by year type and over the longer term.
- Compile a Green Infrastructure Plan, complete with text and supporting tables and figures, that summarizes the work completed from previous tasks, discusses the opportunities and constraints, and presents the recommendations and Project Description Sheets.

**Deliverable: Draft and Final Green Infrastructure Plan.**

## TASK 9.0 INJECTION WELL SITE PLAN

### 9.1 Site Constraints

- Evaluate the three (3) proposed injection well site locations included in the Request For Proposal and assess suitability through review of the following constraints:
  - » Construction area requirements
  - » Availability/access to water for injection
  - » Contaminant source setbacks
  - » Jurisdictional boundaries
  - » Utilities
  - » Property ownership
  - » Geologic boundaries
  - » Environment

### 9.2 Groundwater Flow Analysis

- Utilize the Phase 1A Groundwater Model from the RGSP to evaluate injection scenarios for each of the proposed injection sites during wet and dry periods. Perform injection and production scenario modeling analyses to evaluate mounding conditions from injection of water at each well site. Use particle tracking to evaluate travel times between injection wells and domestic water supply wells.

### 9.3 Technical Memorandum

- Prepare a draft and final technical memorandum presenting the results of the hydrogeologic analyses and flow model scenarios results, including recommendations for well field design, siting and specific injection zones.

**Deliverable: Draft and Final Injection Well Site Plan TM**

## ASSUMPTIONS

- OCSD Atlas Maps are updated to reflect current condition and layout of OCSD's distributions system.
- Information on date installed is available for most of the pipelines in the distribution system and estimates of installation dates for pipelines with unknown installation dates can be developed based on development history.
- Grant reporting and other related administrative activities will be completed by OCSD staff.

# EXPECT WSC



## TRUSTED RESOURCE

The foundation of our WSC-client partnerships and service is based on trust and responsiveness. It is the key to our success with the many clients who have chosen WSC, and continue to choose WSC for their planning services. Our clients tell us they appreciate that we listen intently, anticipate their needs, and routinely go out of our way to help them succeed. We have worked with OCSD staff through the services we provide to the NCMA agencies and we look forward to continuing our partnership to develop a comprehensive, prioritized improvement plan and upgraded water system.

## CUSTOMIZABLE APPROACH

To stay at the forefront of OCSD's infrastructure needs, it is critical that limited funds are effectively applied to get the most results and value. WSC brings a resourceful and creative approach to every project, and will collaborate with OCSD on the best way to apply dedicated resources and investments. We bring the tools, innovative approaches, and a desire to deliver the highest-value results.

## QUALITY RESULTS

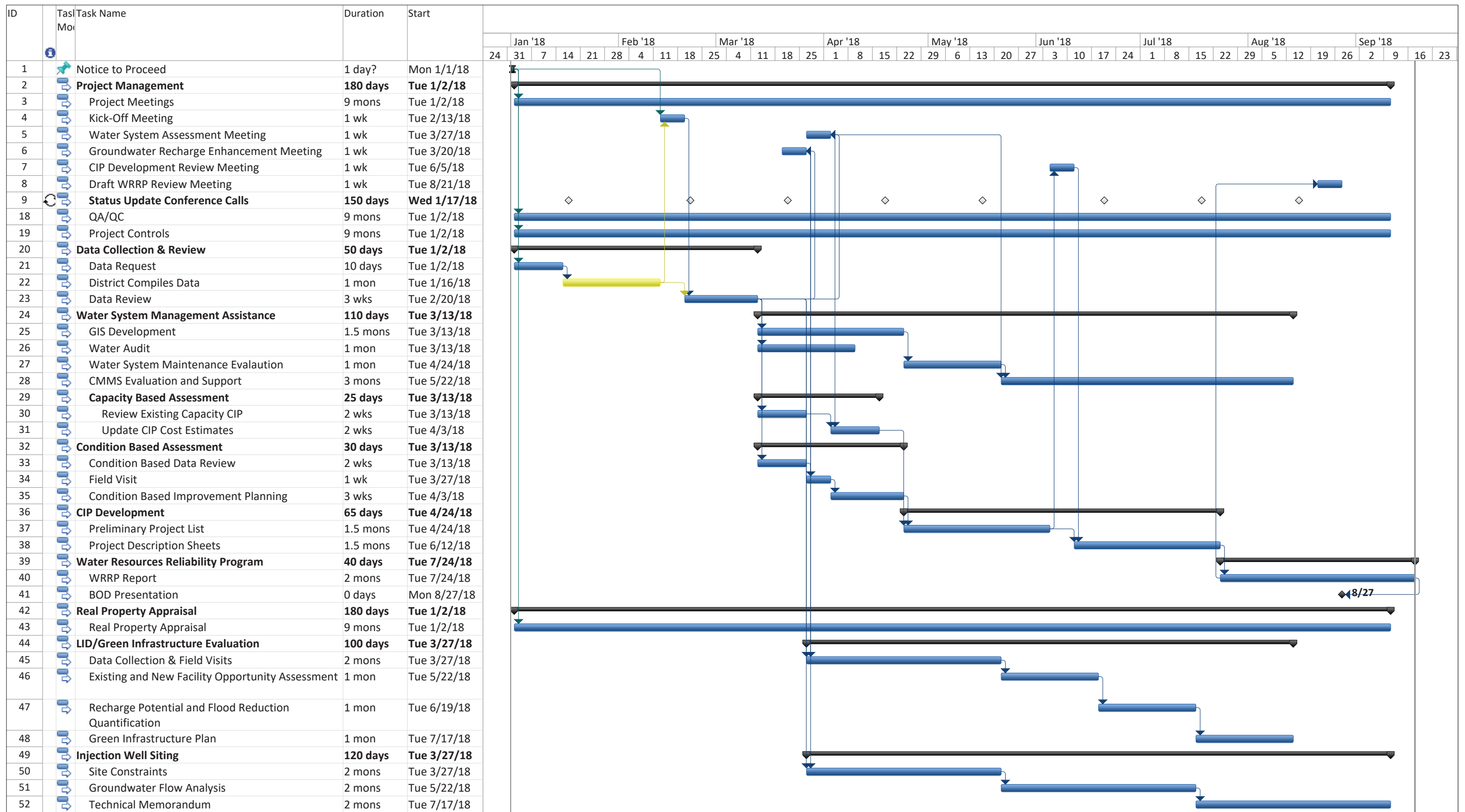
WSC has a reputation for consistently providing high-quality work, and we have an established QA/QC program to ensure these high standards are delivered. We first understand what success looks like from OCSD's point of view, then we establish critical success factors at the outset of each project, and use them to guide our actions throughout execution. We will work as your partner in achieving your immediate and long-term infrastructure system needs.

## IMPLEMENTABLE SOLUTIONS

We know nobody knows OCSD's water system better than the operators and staff who work with it every day. That is why we engage them at every step in the process to ensure their knowledge is being captured and their concerns are being addressed. We have many former public utility employees on our staff and they understand how to deliver projects that are implementable and operator-friendly.



# PROJECT SCHEDULE



Project: WRRP Schedule\_v1  
Date: Thu 11/30/17

Task		Summary		External Milestone		Inactive Summary		Manual Summary Rollup		Finish-only	
Split		Project Summary		Inactive Task		Manual Task		Manual Summary		Deadline	
Milestone		External Tasks		Inactive Milestone		Duration-only		Start-only		Progress	

# Daniel Eric Heimel, MS, PE

## Education

MS, Civil and Environmental  
Engineering, Cal Poly San Luis  
Obispo

BS, Environmental Science,  
California State University Chico

## Professional Registrations

Professional Engineer – Civil,  
California, No. C80762

## Operator Certifications

SWRCB Registered D4 Operator  
#28472

SWRCB Registered T2 Operator  
#26014

## Professional Affiliations

American Water Works  
Association, Member

Air & Waste Management  
Association, Member

## Professional Experience

Mr. Heimel has 15 years of engineering and operations experience in the water and wastewater industry. He has worked for two public water utilities in an operations capacity, making him knowledgeable of the day-to-day operations that keep water supply, water treatment, and water distribution facilities functioning. His experience includes project and program management, hydraulic modeling, GIS implementation, water quality and drinking water utility regulatory compliance, sampling plan development and implementation, recycled water implementation, pilot studies, water quality and water supply watershed monitoring, groundwater recharge facility operations, and water quality data analysis.

## Representative Projects

**Multiple Agencies, Regional Groundwater Sustainability Project, Pismo Beach, CA. Program Manager.** Providing Program Management, Preliminary Design, Funding, and Environmental Document Support services for the Indirect Potable Reuse project that will recover secondary effluent from the City of Pismo Beach and the South San Luis Obispo County Sanitation District's wastewater treatment plants. The advanced treatment facility will use microfiltration or ultrafiltration, reverse osmosis, and ultraviolet radiation and advanced oxidation process before being injected into the Santa Maria Groundwater Basin to supplement groundwater supplies and protect the basin from seawater intrusion.

**Northern Cities Management Area Technical Group (NCMA), Fiscal Year 2014-15 Water Supply, Production and Delivery Plan, Central Coast, CA. Project Manager.** Prepared a water supply, production and delivery plan for NCMA agencies which included developing a spreadsheet model to identify the most reliable scenario for potable water supply and delivery while considering implications of contractual surface water allocations and declining groundwater basin yields. Evaluated intertie pipeline capacity between two separate potable water distribution systems using a merged hydraulic model of the two systems. Developed shared cost structure for implementation, operation and maintenance of the intertie pipeline.

**City of Arroyo Grande, Water System Master Plan Update. Project Engineer.** Updated water system GIS mapping using record drawings and information provided by City staff. Created a WaterGEMS hydraulic model for the water distribution system from updated GIS mapping. Utilized customer record data to spatially allocate water demands and develop updated land use water demand factors. Utilized the GIS tools and the hydraulic model to perform a condition based assessment of the City's water mains. Developed a comprehensive 20 year CIP plan to guide the City's infrastructure projects.

**South San Luis Obispo County Sanitation District, Satellite Water Resource Recovery Facility & Groundwater Recharge Planning Study. Project Manager.** Evaluated the development of a Satellite Wastewater Resource Recovery Facility to allow the District to recover this water resource and put it to beneficial use in a groundwater basin threatened by seawater intrusion. This study provided recycled water to offset potable demands. It will also provide the District with new upstream treatment capacity and increased redundancy for its existing treatment plant. Prepare a grant application to the SWRCB to cover 50% of the cost of the study. This study will focus on economic feasibility of a SWRRF compared to other supplemental water supply alternatives and the evaluation of multiple recycled water alternatives including: 1) landscape irrigation; 2) agricultural irrigation; and/or 3) groundwater recharge through surface recharge and/or irrigation wells.

**Alameda County Water District, Groundwater Recharge Facilities Operations and Maintenance Management. Project Engineer.** Developed groundwater recharge monitoring database to track all operations of the Alameda Creek diversion facilities and groundwater recharge ponds. Directed maintenance of meters and valves at the groundwater recharge facilities. Compiled data and created regulatory reports related to the groundwater recharge operations. Oversaw watershed water quality monitoring and used GIS to spatially analyze water quality data.

**Apple Valley Ranchos Water Company, North Apple Valley Water System Improvement Plan. Project Engineer.** Evaluated the capability and reliability of the Bell Mountain and Stoddard Pressure Zones in north Apple Valley, which have low customer demands and high fire flow requirements. Spatially allocated existing demands, performed hydraulic analysis of the existing system using AVRWC's hydraulic model in InfoWater, evaluated multiple system level alternatives for each pressure zone, including changing the HGL; and developed a CIP to improve the existing system. Recommended revised pressure zone boundaries and performed a preliminary parcel screening to identify potential tank and booster stations sites needed to serve the study area as demands increase.

**NCMA, Engineering Services. Project Manager.** Provided as-needed engineering services for the City of Arroyo Grande, City of Grover Beach, City of Pismo Beach, and the Oceano Community Services District. Coordinated monthly meetings of NCMA, and interfaced with local and statewide regulatory agencies as an authorized agent of NCMA.

**NCMA, Lopez Pipeline Capacity Assessment. Project Engineer.** Created and calibrated a GIS based hydraulic model of the Lopez pipeline to analyze the capacity of the pipeline to deliver additional State Water Project (SWP) deliveries to the Northern Cities. Evaluated delivery scenarios to determine maximum delivery potential under existing conditions and potential deliveries with infrastructure improvements. Developed delivery schedules for future SWP deliveries based on historical demand data and pipeline capacity results.

**City of Santa Maria, 2012 Utilities Master Plan Update-Water. Project Engineer.** Developed spatially allocated demands for current and future demands through buildout using GIS for incorporation into a hydraulic model. Calculated land use demand factors based on current development and projected demands based on zoning. Created and calibrated the water system hydraulic model in InfoWater. Utilized the model for a capacity assessment and a prioritized CIP to meet present, 5-year, 10-year, and buildout conditions.

**Descanso Community Water District, Comprehensive Planning Study. Project Engineer.** Performed a comprehensive analysis of the Descanso Community Water District's water system. Investigated and evaluated integrated treatment systems for the removal of iron, manganese and radon at the District's two production wells. Reviewed demand projections, supply availability, water quality data, and production records to develop a 20 year CIP plan for the District.

**San Miguelito Mutual Water Company, Chevron Tank Farm Service Extension Feasibility Study-Phase 1. Project Engineer.** Assessed the capacity of SMMWC's water and wastewater systems under current and future conditions, including the inclusion of a proposed development at the Chevron Tank Farm. Developed water and wastewater base maps in GIS and conducting an analysis of demand, supply, capacity and storage for SMMWC's existing and projected infrastructure. Developed demand and loading estimates for the current SMMWC service area at build-out. Analyzed the projected water demand and wastewater loading from the proposed development and compared against existing SMMWC demand/loading factors and the capacity of the SMMWC's water and wastewater systems. Prepared a summary Technical Memorandum that describes the existing systems, proposed growth and recommendations completing future phases of the project.

## Joshua H. Reynolds, MS, PE

### Education

MS, Civil and Environmental  
Engineering, California  
Polytechnic University, San Luis  
Obispo, CA

BS, Civil Engineering, California  
Polytechnic University, San Luis  
Obispo, CA

### Professional Registrations

Professional Engineer - Civil,  
California, No. C65400

### Professional Affiliations

American Society of Civil  
Engineers, Member

### Professional Experience

Mr. Reynolds is Vice President of WSC and has 18 years of civil engineering experience. He specializes in pipeline design, hydraulic analysis, pump station design and analysis, construction administration, city engineering, and water and sewer master planning. His experience allows him to identify and analyze initial project concepts, prepare construction documents, and monitor construction of the project through project completion.

### Representative Projects

**Multiple Agencies, Regional Groundwater Sustainability Project, Pismo Beach, CA. Technical Advisor.** Providing program management and design engineering services for the development of an Indirect Potable Reuse (IPR) project to recharge the Santa Maria Groundwater Basin. The RGSP will provide additional treatment of the water, including micro/ultra-filtration, reverse osmosis and advanced oxidation, and injection of the advanced purified water into the groundwater basin to maintain groundwater levels and prevent seawater intrusion. Project is being funded by approximately \$30 million in regional, state, and federal funding initiatives.

**City of Pismo Beach, 2015 Water Master Plan Update, Pismo Beach, CA. Project Manager.** Performing an update of the City of Pismo Beach 2004 Water Master Plan. Creating and calibrating an all-pipes, spatially allocated demand hydraulic model of the City's water distribution system using Bentley's WaterGEMS software. Utilizing the hydraulic model to evaluate capacity limitations for current and future buildout scenarios and opportunities to optimize operations. Developing condition based-replacement plans for aging infrastructure and an updated CIP project list to prepare the City for budget planning.

**City of Santa Maria, 2012 Utility Capacity Study, Santa Maria, CA. Project Manager.** Preparing a Master Plan Update to assess the capacity of the City's water and wastewater collection system, and developing a prioritized, risk-based capital improvement plan for the utilities. The plan update includes development of a new water model in InfoWater and a sewer collection system model in SewerGEMS. The models were loading using actual spatially allocated water consumption data.

**Casitas Municipal Water District, Water Master Plan and Capital Improvement Plan, Ojai, CA. Technical Advisor.** Conducting a condition-based assessment and developing a Water Master Plan for the new owner of the Ojai water system. Tasks include developing opinions of probable cost for recommended projects, and evaluating production and consumption data to develop projections and recommend improvements necessary to maintain a safe and reliable level of service. Developing, calibrating, and utilizing hydraulic model of the system in conjunction with GIS datasets to improve system operations and CIP development. Evaluating the capacity of the existing water system and identifying improvements to meet demands, including fire flow, of the current and future population.

**Victorville Water District, Water District Master Plan Update 2016, Victorville, CA. QA/QC.** Preparing an update to the District's drinking water production and distribution system master plan. Work includes minor updates to existing water InfoWater hydraulic model, identifying and evaluating system improvements, performing a water quality evaluation, developing a capacity-driven Capital Improvement Plan, and developing a Rehabilitation and Replacement Plan. Work also includes preparing a recycled water master plan for the SCLA area located within the District's boundary and a SCADA master plan.

**City of Arroyo Grande, 2011 Water System Master Plan, Arroyo Grande, CA. Project Manager.** Developing a master plan for the City's drinking water production and distribution system. Work includes development of an updated hydraulic model using WaterGEMS software, and application of GIS datasets to conduct a risk-based condition assessment of the water distribution system to recommend prioritized improvements.

**City of Paso Robles, 2015 Water Master Plan, Paso Robles, CA. Project Manager.** Update included a survey of capacity limitations to anticipate expected growth along the outskirts of the existing infrastructure. Analysis of the aging pipeline detailed needs for replacement or rehabilitation of the distribution system to avoid failure in the future. Developed a Capital Improvement Plan and identified needs through a system analysis for the City to act upon.

**Templeton Community Services District, 2012 Water System Master Plan Update. Project Engineer.** Prepared updated water distribution and treatment system master plan including: updated system mapping; development of GIS dataset for the distribution system; spatially allocated water demands using customer consumption records; development of land use water demand factors; creation and calibration of a new hydraulic model; estimated build-out and future demands; hydraulic capacity evaluation; development of a 20 year CIP plan; and preparation of an Integrated Resources Plan combining master plan updates for the District's water and sewer systems.

**Apple Valley Ranchos Water Company, North Apple Valley Water System Improvement Plan, Town of Apple Valley, CA. QA/QC Engineer.** Evaluated the capability and reliability of Bell Mountain and Stoddard Pressure Zones, which currently have low customer demands and high fire flow requirements. Spatially allocated existing demands, performed hydraulic analysis of the existing system using hydraulic model in InfoWater, evaluated multiple system level alternatives for each pressure zone, including changing the HGL; and developed a CIP to improve the existing system. Recommended revised pressure zone boundaries and performed a preliminary parcel screening to identify potential tank and booster stations sites needed to serve the study area as demands increase.

**City of Pismo Beach, Hollister Avenue Upgrades, Pismo Beach, CA. Project Manager/Engineer.** Prepared plans, specifications and cost opinions for 500 LF of 8-inch water main, and rehabilitation of the existing concrete pavement, and curb, gutter and sidewalk upgrades.

**McDonalds Corporation, Five Cities Drive Waterline Relocation, City of Pismo Beach, CA. Project Manager/Project Engineer.** Designed and prepared construction documents for a 450 LF of 12-inch PVC waterline relocation. The project re-aligned and upgraded the existing 8-inch pipeline to 12-inch as recommended in the City of Pismo Beach Water Master Plan, and moved the pipeline off the proposed McDonald's site. Project included construction observation and record drawing preparation.

**City of Arroyo Grande, Reservoir 1 Replacement Project, City of Arroyo Grande, CA. Project Engineer.** Prepared construction documents for a 2.0 million gallon buried concrete water storage tank. Duties included preparation of site grading plans, waterline alignment and details, storm drain alignment, coordination of dry utility relocation, and construction phasing documents.

**Big Bear Lake Department of Water and Power, Preliminary Engineering Report for the 2013 Water System Improvements. Technical Advisor.** Prepared a Preliminary Engineering Report to accompany an application to USDA Rural Development to request \$4.157 Million in grant and loan funding. The PER provided the background, analysis, justification, cost estimates and implementation schedule for two projects: (1) a 1.0 MG potable water reservoir and 2,750 LF of 12-inch transmission main and (2) drilling and equipping of a potable well and pumping plant and 5,600 LF of 8-inch transmission main.

## Jeroen Olthof, MS, MBA, PE

### Education

MBA, USC

MS, Civil Engineering, University of Washington

BS, Civil Engineering, University of Colorado Boulder

### Professional Registrations

Professional Engineer- Civil, California, No. C58597

### Articles

*San Diego's Recipe for Overflow Reduction*, Public Works, June, 2004.

*Capacity Assurance Sets Stage for CMOM Success*, Waterscapes, Vol. 13, No. 2, May, 2002

### Presentations

*Management of Sewers in Environmentally Sensitive Areas*, ASCE Pipelines Conference, San Diego, CA 2004

*Lessons Learned in San Diego's Collection System Assessment Program*, Water Environment Federation (WEF) Collection Systems Conference, Austin, TX, June, 2003

*Automated Decision Tools for Sewer Collection System Assessment*, California Water Environment Association Conference (CWEA), Ontario, CA, 2003

*Improved Collection System Management Using GIS*, Water Environment Federation Technology and Exposition Conference (WEFTEC), Chicago, IL, October, 2002

*An Incremental Approach to GIS and Floodplain Mapping*, Floodplain Management Association Conference, Sacramento, CA, September, 2000

*A Hydrogen Sulfide Screening Tool Within GIS*, WEFTEC, Collection Systems Conference, Salt Lake City, UT, May, 1999

### Professional Experience

Mr. Olthof brings more than 25 years of experience in planning, design, and management of water infrastructure. He specializes in hydraulic modeling of pipe networks, feasibility studies, infrastructure condition assessment, and comprehensive master planning. His experience includes database development and integration of geographic information systems (GIS) with hydraulic models, recycled water customer databases, and asset databases. He has developed and maintained custom databases to track recycled water customers and generate reports for regulatory agencies and other stakeholders. He has also developed condition assessment programs and decision algorithms to support capital improvement planning and maintenance optimization.

### Representative Projects

**Calaveras County Water District, Ebbetts Pass Water Master Plan, San Andreas, CA. Project Engineer.** The master plan addresses existing and projected future demands, future water supply sources, existing and known future regulatory requirements, limitations to the current treatment process and capacity, alternative treatment processes, facility deficiencies, limitations of current facility communications, identification of flaws in security at facilities, and identification of facility improvements and timelines for those improvements. Operation and maintenance issues that were evaluated include tank and pipe leaking, improper or nonfunctioning pressure reducing valves, Haloacetic Acid formations in the water, and pressure regulation. The project also involved hydraulic modeling of the system, 20-year life-cycle cost analysis, and preparation of a financial plan to fund the construction of a phased capital improvements program and to replace facilities due to age or new regulations.

**Orange County Water District, Recharge Water Sediment Removal Feasibility Study, Santa Ana, CA. Project Engineer.** Conducted a feasibility study to determine the most cost-effective alternatives to remove sediments from the Santa Ana River so more water can be recharged through existing and future facilities into the aquifer system. Evaluated potential technologies and strategies, including in-river management and removal, chemical/physical removal, and mechanical removal. The results served as the foundation upon which a CIP was developed to maximize groundwater recharge.

**Casitas Municipal Water District, Water Master Plan and Capital Improvement Plan, Ojai, CA. Project Engineer.** Conducting a condition-based assessment and developing a Water Master Plan for the new owner of the Ojai water system. Tasks include developing opinions of probable cost for recommended projects, and evaluating production and consumption data to develop projections and recommend improvements necessary to maintain a safe and reliable level of service. Developing, calibrating, and utilizing hydraulic model of the system in conjunction with GIS datasets to improve system operations and CIP development. Evaluating the capacity of the existing water system and identifying improvements to meet demands, including fire flow, of the current and future population.

**City of West Sacramento, Drainage Study for Jefferson Boulevard Widening, West Sacramento, CA. Task Manager.** Provided predesign and hydrologic/hydraulic analyses of drainage improvements for the Jefferson Boulevard widening project. Services included HEC 1 hydrology, pipeline and channel hydraulics, pipe layouts and sizing, and siting and sizing for regional detention storage and pump stations. The project reach is approximately two miles long, encompassing approximately 1,200 acres.

**City of Redmond, Water System Master Plan, Redmond, WA. Project Engineer.**

Assisted with update of the water system master plan, which included documenting a water system description, preparing a demand forecast, documenting an update of the city's conservation program, preparing a CIP, identifying the total cost of providing water service, and assisting the city to establish adequate fees for service. Hydraulic modeling of the potable water system was performed using WaterCAD/GEMS.

**City of Reedley, Water System Master Plan, Reedley, CA. Project Engineer.** Prepared a master plan for the city's water system (population 25,000), which included: determining projected water supply and demand requirements; developing potable water planning criteria for modeling and evaluation of the infrastructure; evaluating water supply alternatives (new groundwater wells and new regional surface water supply); updating the existing hydraulic model (H2OMap Water) to include demand projections; identifying deficiencies in pumping capacity, storage capacity, or pipeline sizing; developing a capital improvement program, which included estimated operations and maintenance costs, estimated construction cost, and staffing needs for the recommended projects; determining preferred locations and how much additional storage capacity is needed to meet the current and future water demands.

**Water Research Foundation, Asset Management Research Needs Road Map for Water and Wastewater Utilities, Denver, CO. Task Manager.** Responsible for preparing case studies of two utilities to document current asset management practice, and conducting staff interviews. The objective of this AwwaRF Project was to develop a strategic plan for conducting future research on asset management for infrastructure owned and operated by drinking water and wastewater utilities. The approach included conducting a comprehensive review of pertinent literature and ongoing research, with documentation in a white paper; conducting a workshop attended by 30 utility asset management practitioners along with other industry experts from academia, consulting and software development to discuss research needs; and ultimately, developing a multi-year research roadmap that included specific research projects, a schedule, and budgets.

**California American Water, Ambler Park Water System Master Plan, Monterey, CA. Project Manager.** Provided a facilities plan for the Ambler Park water system, which includes three wells, one water treatment plant, eight pressure zones, 10 miles of water pipeline in sizes ranging from 2 inches to 8 inches in diameter, seven remote water storage tanks, one hydro-pneumatic tank, five pumping stations, and three pressure regulating valves (PRVs). A hydraulic model of the system was developed using EPANET.

**City of Burien, Burien Drainage Master Plan, Burien, WA. Project Engineer.**

Performed XP SWMM modeling of the Miller Creek basin, analyzed current conditions, and evaluated possible improvements.

**University of California, Drainage Master Plan for University Community Concept Planning, Merced, CA. Project Engineer.** Used GIS to show preliminary 100-year floodplain for the storm drainage facilities plan. The storm drainage master plan identifies facilities (includes open channels and detention basins) needed to accommodate flooding with minimal damage and prevent flooding from becoming worse due to development of the new University of California complex in Merced. Design storms and existing conditions hydrologic modeling was also performed.

**San Bernardino Valley Municipal Water District, Regional Recycled Water Concept Study & Grant Application, San Bernardino, CA. Senior Engineer.** Collaborated with nine agencies to identify potential regional recycled water projects to improve local water supply reliability and sustainability. Evaluated alternatives based on economic, social and environmental criteria. The process was integrated with the Upper Santa Ana River Habitat Conservation Plan, which is critical to achieving local habitat sustainability and permitting regional recycled water projects.

## Scott Duren, PE

### Education

BS, Civil and Environmental  
Engineering, UC Davis

### Professional Registrations

Professional Engineer- Civil,  
California, No. C68058

Professional Engineer- Civil,  
Florida, No. C64181

Professional Engineer- Civil,  
Washington, No. C53208

Professional Engineer- Civil,  
Oregon, No. C89922

### Professional Experience

Mr. Duren specializes in water pumping and conveyance and also has a wide variety of experience working with municipal government, federal government and private sector clients on projects involving stormwater discharge and quality, civil site development, remediation and flood control. He has served as project engineer or project manager on many infrastructure projects including water transmission and intake pipelines.

### Representative Projects

**Water System Rehabilitation Projects, California American Water Company, Various Locations, California. Senior Technical Reviewer.** Performed technical reviews of design and construction documents for various water rehabilitation projects that included potable water distribution pipeline and booster pumping station replacements. Designs included open cut pipeline installation within public road right-of-ways, packaged booster pumping station installation, and rehabilitation and expansion of an existing booster pump station.

**Sheridan Water Supply Project, Placer County Facility Services, Sheridan, California. Project Manager.** Oversaw the engineering during the construction of a 250 gpm new water supply well, booster pumping station, 180,000 gallon storage tank, and approximately one-half mile of new potable water conveyance pipeline for the City of Sheridan. The project was funded by a grant from the U.S. Department of Agriculture's Rural Utilities Service program. The project addressed deficiencies in meeting fire flow requirements for the community, and allowed a 20-year moratorium on development to be lifted.

**Long Ravine Pipeline Replacement Project, Placer County Water Agency, Colfax, California. Project Engineer.** Analyzed alignment alternatives and designed a 30-inch welded steel pipeline to replace approximately one mile of 100-year old riveted steel pipeline that was a critical piece of the Boardman Canal raw water conveyance system. Design included a new intake screening system, downstream control valves, turnouts for future hydroelectric power generation, reconnection of services, and continuous service to the City of Colfax. Prepared permit applications for encroachment within the Union Pacific Railroad, Caltrans, and Placer County Public Works right-of-ways and worked with the real estate department to obtain easements along private property. The project included a tunnel underneath Interstate 80, and installation within a casing parallel to the railroad tracks.

**Parkside 36-Inch Transmission Main Design, City of Woodland, California. Project Engineer.** Scott assisted in recommending pipe material and corrosion options for a new 36-inch potable water transmission main that will convey surface water from a new water treatment plant into the existing City distribution system. His recommendations included other design considerations such as air release valve and blow-off spacing and future maintenance access port locations. Scott also prepared Caltrans highway crossing alternatives, including various trenchless construction options for jack and bore installations.

**Freeport Pipeline Facilities Project Design and Construction, Segments 2 and 4, Sacramento County, California. Project Engineer.** Managed the design of approximately seven miles of 84-inch-diameter welded steel pipe for conveying 185 mgd of raw water and one mile of 66-inch-diameter WSP for conveying 100 mgd to the Vineyard Surface Water Treatment Plant. Design aspects included a hydraulic surge tank, raw water sampling instrumentation, a flow control structure that included magnetic flow meters and flow controlling sleeve valves, and various isolation valves, drains and air release valves.



**California Water Service, Dominguez 232 Pump Station Upgrade, Torrance, CA. Project Manager.** Prepared design plans and specifications for the replacement of the Zone 1 booster station. The Project included the replacement of aging and capacity deficient infrastructure with four 2,500 gpm vertical turbine pumps and new site piping. The Project was designed to keep the existing booster station operational during construction.

**City of Fort Washakie Water Supply Conveyance System Improvement Study, Fort Washakie, Wyoming . Associate Engineering.** Scott modeled the effects of a planned distribution expansion to the existing water supply conveyance system at Fort Washakie. He verified system pressures would remain within a specified range and adequate fire and peak use flows would be provided.

**Cornelius Pass Road Alignment Evaluation, Willamette Water Supply Program, Hillsboro, Oregon. Project Engineer.** Scott led the technical evaluation of an alternative alignment for a 48-inch diameter welded steel water transmission main. Evaluation included developing a 30-percent design including trenchless creek and railroad crossings and seismic induced liquefaction mitigation. The study provided sufficient justification for a revision to the program alignment to save ratepayers nearly \$5.5M.

**City of Cape Coral Northeast Loop Utility Betterment Project, Cape Coral, Florida. Project Manager.** Scott managed the design during construction for the \$2.2M construction project overseeing tie-in of a metered water main between the City of Cape Coral and Lee County Utilities for water purchases between the utility district and the city.

**Northern and Southern Advanced Water Treatment Facilities, Marine Corps Base Camp Pendleton, California. Project Engineer/Task Manager.** The project consisted of preliminary engineering design and the preparation of design build request for proposal documents for the construction of two new 8.5 MGD Advanced Water Treatment Plants and the associated conveyance and distribution systems. Each of the treatment facilities use reverse osmosis membranes, granular activated carbon and chemical injection to treat groundwater for distribution throughout the base. Scott oversaw the preparation of a Basis of Design report, preliminary engineering drawings and specifications, and the Request for Proposal.

**City of San Bernardino Muscoy Operable Unit Groundwater Treatment Plant, San Bernardino, California. Project Engineer.** Scott authored an Operations, Maintenance and Performance Manual for a 22-MGD groundwater treatment plant utilizing twenty-four vessels, each containing 30,000-lbs of granular activated carbon. The treatment plant is designed to treat groundwater contaminated with TCE and augment the city's and county's drinking water supply distribution systems.

**City of Ft. Washakie Water Treatment Plant Expansion, Fort Washakie, Wyoming. Associate Engineer.** Scott designed and drafted the piping layout for the expansion of the Fort Washakie water treatment plant through the installation of an additional filter/clarifier unit. He evaluated three alternatives and provided a recommendation for an additional plant intake along the Wind River that would increase the plant capacity. He also served as part of the construction team that installed and tested the additional filter/clarifier.

**Folsom South Canal Connection Project, Engineering Services during Construction, East Bay Municipal Utility District, Camanche Reservoir, California. Project Engineer.** Scott managed the engineering services during construction for approximately twenty miles of 72-inch diameter welded steel pipe for conveyance of raw water from the Folsom Canal to the Mokelumne Canal. Services included a contractual agreement to respond to all submittals and requests for information within 5 business days.



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## TIMOTHY S. CLEATH, PG, CEG, CHG

Principal Hydrogeologist / Engineering Geologist

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Tim Cleath, a certified hydrogeologist (CHG) and certified engineering geologist in California (CEG), is the president of Cleath-Harris Geologists. Tim has an extensive understanding of water resources gained through over 30 years of hands-on experience and personal involvement with water issues on the Central Coast. Tim also performs volunteer work in hydrogeology that spans the globe. Tim's knowledge of local ground water conditions and his working relationships with local and State agencies will greatly facilitate and expedite projects. Tim brings personal specific historical insights into the hydrogeology of the Tri-Cities Mesa area and the Arroyo Grande Creek-Cienega Valley.

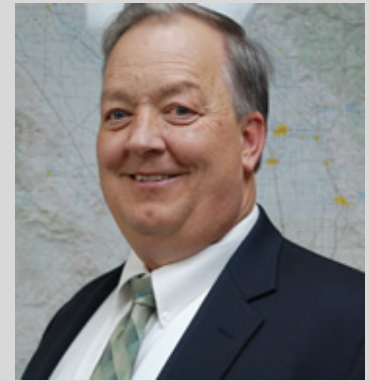
### RELEVANT WORK EXPERIENCE

#### **Regional Groundwater Sustainability Project, Arroyo Grande/Tri-Cities Mesa Area, City of Pismo Beach and Water Systems Consulting (2016-2017)**

Managed project, guided aquifer definition work, identified injection and monitoring well sites, established injection well/extraction well scenarios. Supervised development of hydrogeologic conceptual model for groundwater modeling of the Tri-Cities Mesa portion of the Santa Maria Groundwater Basin. Interpreted model results relative to groundwater sustainability and protection from seawater intrusion.

#### **Well Siting Studies, City of Arroyo Grande (various years from 1989 to 2017)**

Assisted the City in evaluating possible well sites tapping groundwater sources in the City of Arroyo Grande. The evaluations included geologic mapping, preparation of geologic cross sections, and groundwater quality assessment.



#### EDUCATION

M.S. Geology, 1978  
California State University, Los Angeles  
B.A. Geology, 1974  
California State University, Fresno

#### PROFESSIONAL REGISTRATION

California:  
Certified Hydrogeologist, HG 81  
Certified Engineering Geologist, CEG 1102  
Professional Geologist, PG 3675

#### PROFESSIONAL ASSOCIATIONS

Association of Engineering Geologists  
National Ground Water Association

#### CAPABILITIES

##### Water Resource Management

- Water rights
- Hydrologic inventories
- Hydrogeologic characterization
- Groundwater recharge and banking
- Water conservation methods
- Basin sustainable yield optimization
- Institutional approaches
- Wastewater disposal siting and analysis
- Water quality investigations
- Well design and construction monitoring
- Groundwater monitoring programs
- Environmental impacts assessments

##### Engineering Geology

- Sea cliff retreat
- Seismic hazard assessment
- Landslide studies
- Dam siting
- Subsidence assessment and mitigation
- Geotechnical investigations

##### Field Exploration:

- Well site evaluation
- Geologic mapping
- Aquifer testing
- Drilling programs
- Geophysical survey analysis
- Stream flow monitoring



**Hydrogeologic Study and Groundwater Recharge Analysis, San Luis Obispo Valley Groundwater Basin, City of San Luis Obispo and Water Systems Consulting (2017)**

Directing the hydrogeologic characterization of the San Luis Obispo portion of the San Luis Obispo Valley Groundwater Basin, including a numerical groundwater modeling analysis of recharge using reclaimed water. The modeling analysis is evaluating the available groundwater storage capacity, groundwater extraction scenarios, and opportunities for enhancing groundwater sustainable yield through reclaimed water recharge via injection wells or percolation basins.

**Nipomo Mesa Management Area 2015 Annual Groundwater Monitoring Report, Basin Management Committee (2016)**

Worked with technical committee on annual report components, specifically focusing on the definition of aquifers and the geology along the NCMA/NMMA boundary. Tim has been a part of the Technical Committee since its inception following the expert's committee serving the court during the adjudication process.

**Groundwater Studies, Spanish Springs Ranch, Price Canyon, King Ventures (2009)**

Characterized the alluvial groundwater within Price Canyon downstream of Ormonde Road. Managed well drilling project to tap the alluvium and performed pumping tests/interference and stream influence impacts tests. Prepared geologic cross sections. Sampled groundwater and interpreted analytic results. Measured stream flows and monitored groundwater levels. Studied potential impacts of oil field operations on alluvial wells.

**Groundwater Development Studies, City of Pismo Beach (1985-1988)**

Investigated the potential for developing groundwater in Pismo Creek Valley including test hole drilling, seismic refraction survey, stream flow modeling, well drilling and testing, contouring the base of the alluvial sediments, interpreting groundwater quality analyses and mapping the Wilmar Avenue fault.

# Adam Rianda, PE

## Education

BS, Environmental Engineering,  
California Polytechnic State  
University, San Luis Obispo

## Professional Registrations

Professional Engineer – Civil,  
California, No. C86545

## Professional Experience

Mr. Rianda is a professional engineer with three years of civil engineering experience with an emphasis in surface water hydrology and hydraulics. His experience includes stormwater management planning and design, flood hazard assessment, stream and wetland restoration design, preparation of construction documents, and hydrologic and hydraulic modeling via a wide array of 1D and 2D modeling platforms.

## Representative Projects

**California Water Service, Dominguez 232 Pump Station Upgrade, Torrance, CA. Staff Engineer.** Prepared design plans and specifications for the replacement of the Zone 1 booster station. The Project included the replacement of aging and capacity deficient infrastructure with four 2,500 gpm vertical turbine pumps and new site piping. The Project was designed to keep the existing booster station operational during construction.

**County of San Luis Obispo, CSA 10A Cayucos Tanks Replacement, San Luis Obispo County, CA. Staff Engineer.** Preparing design plans and specifications for the replacement of an aging 210,000 gallon water storage tank. Design includes the addition of a second storage tank of equal size adjacent to the replaced tank. Project involves a water quality impact evaluation to guide the mitigation of potential increases in Disinfected By-Products formation.

**Canyon del Rey Master Drainage Plan, Monterey County Water Resources Agency, Monterey, CA. Assistant Engineer.** Responsible for the hydrologic and hydraulic modeling of the Canyon del Rey Watershed for the updated Master Drainage Plan. The project included the development a hydrologic model used in the hydraulic analysis of the primary and secondary stormwater facilities. The project utilized LIDAR topographic and survey information to delineate watershed in AutoCAD, developed hydrologic models in HEC-HMS, and performed necessary hydraulic analyses on the stormwater facilities using HY-8.

**Promenade Property Stormwater Management Planning and Design, Antioch, CA. Assistant Engineer.** Design of two stormwater basins, mitigating increased stormwater runoff and peak flows while providing water quality treatment per the Contra Costa County guidelines. Prepared water quality and hydromodification sizing using County methodologies. Developed hydrologic models in HEC-HMS for flood control analysis. The stormwater infrastructure approach and results of the modeling were coupled into a stormwater management plan and submitted for CEQA purposes.

**City of Arroyo Grande, Le Point Area Main Upgrade, City of Arroyo Grande, CA. Project Engineer.** Prepared design plans and specifications for the replacement of aging drinking water infrastructure. The Project includes the replacement of approximately 2,460 LF of 4-inch cast iron water main with 8-inch PVC pipe in addition to the replacement of hydrants and residential service connections. Project was designed to keep existing system operational during construction.

**Pipeline Replacement – Big Bear City Community Services District, Big Bear City, CA. Staff Engineer.** The Peter Pan Area portion of this project includes the design and replacement of approximately 8,250 feet of existing 2-inch and 6-inch steel and 4-inch asbestos cement (AC) water mains with new 8-inch pipeline. The Sheridan Drive component of the project includes the design and replacement nearly 450 feet of existing 2-inch steel water mains with new 8-inch pipeline.

**Pipeline Replacement – Big Bear Lake Department of Water and Power, Big Bear Lake, CA. Staff Engineer.** Project includes the design and replacement of 4,000 LF of existing 12-inch steel pipe with 12-inch PVC pipe along Big Bear Blvd and Georgia St.

**Patterson Ranch Wetland Design, Alameda County, CA. Assistant Engineer.** Task included identifying contributing watersheds and conditions conducive to supporting both the existing extent of the wetland as well as the expanded acreage to meet mitigation targets. Responsible for the completion of design calculations related to assessing the quantity of runoff necessary to support the proposed, expanded wetland area. Prepared designs for three bioretention basins to treat the project site runoff and comply with County water quality treatment and design standards and an addendum to the previous Stormwater Management Plan outlining the new modifications. Served as the lead drafter for the construction documents and cost estimates related to the wetland area and stormwater facilities.

**Lagoon Valley Stormwater Management and Restoration Design, Vacaville, CA. Assistant Engineer.** Project aimed to reduce post-project peak flow to that of 90% of the pre-project peak flow, while incorporating approved BMP features for stormwater quality treatment. Modeled the 2,700 acre watershed for the development. Approach included hydrologic analysis of the watershed using the HEC-HMS software and HEC-RAS to model the conveyance of runoff through lake features, wetlands, and storm drain networks. Provided hydrologic and hydraulic modeling support to the design of nearly 11 acres of mitigation wetland. Drafted construction documents, composed technical specifications, and provided engineering estimates for the creation of the mitigation wetlands.

**Updated Flood Control Study for County Services Area 50, Monterey County Resource Management Agency, Monterey, CA. Assistant Engineer.** Developed 1D/2D XP STORM model of commercial and residential neighborhoods bordered by the Lower Carmel River levee. Used modeling efforts to display the deficiency in the stormwater infrastructure during peak design storm water surface elevations for the Lower Carmel River, upgrades were recommended to the County based on the model results.

**Cowan Property Stormwater Management Planning and Design, Antioch, CA. Assistant Engineer.** Mitigate for increased stormwater runoff while reducing peak flows per the Contra Coast County guidelines. Responsible for HEC-HMS hydromodification and CCHM hydrologic modeling to assist in the design of two stormwater basins.

**Tassajara Stormwater Management Design, Contra Costa County, CA. Assistant Engineer.** Project included the design of a multi-purpose stormwater basin, sized to meet water-quality, hydromodification, and flood control requirements. Prepared necessary calculations and modeling for the design of the basin.

**Bay Area Integrated Regional Water Management Plan DAC Flood Study, Contra Costa County Flood Control and Water Conservation District, Bay Point, CA. Assistant Engineer.** Project included modeling local stormwater drainage infrastructure and overland flow during County design storm events. Prepared 1D/2D XP STORM models to analyze the effectiveness of BMPs such as permeable pavement and rain gardens.

**La Vista Stormwater Management Plan, Hayward, CA. Staff Engineer.** Updated previous modeling efforts and issued a comprehensive stormwater management plan for the La Vista residential development in the City of Hayward. Carried out non-steady state hydrology and hydraulic modeling of the stormwater infrastructure using the MIKE-URBAN platform. An important element of the stormwater system was located in the new City Park where sports facilities were designed to provide temporary stormwater storage for very large storm events.

## Kirsten L. Plonka, PE

### Education

BS, Civil Engineering, California Polytechnic State University, San Luis Obispo

MS, Management, Colorado State University, Global Campus (in-process)

MS, Organizational Leadership, Colorado State University, Global Campus (in-process)

### Professional Registrations

Professional Engineer – Civil, California, No. C70746

### Professional Affiliations / Certifications

American Society of Engineers

American Public Works Association

Engineers Without Borders (former Southern California State Representative)

Potable Reuse Advisory Committee, San Diego County Water Authority

Advanced Water & Wastewater Modeling Certified by Innovyze & Bentley

### Publications

"Health Effects Study on Potable Water Reuse", A&WMA

### Industry Recognition

2013 Outstanding Water Project of the Year from Region 9 ASCE, Award of merit for San Diego Section ASCE for Pala Mesa Tank

### Professional Experience

Ms. Plonka brings more than 15 years of experience in the planning, design, and management of water and recycled water systems. She specializes in project management, hydraulic modeling, condition assessments, feasibility studies, infrastructure and water resource planning studies, and master planning, including Capital Improvement Plans and budgeting. She is well versed in funding alternatives, regulatory compliance, and public policy development. Her experience includes database development and integration of geographic information systems (GIS) with hydraulic models, recycled water customer databases, and asset databases.

### Representative Projects

**Casitas Municipal Water District, Water Master Plan and Capital Improvement Plan, Ojai, CA. Project Manager.** Conducting a condition-based assessment and developing a Water Master Plan for the new owner of the Ojai water system. Tasks include developing opinions of probable cost for recommended projects, and evaluating production and consumption data to develop projections and recommend improvements necessary to maintain a safe and reliable level of service. Developing, calibrating, and utilizing hydraulic model of the system in conjunction with GIS datasets to improve system operations and CIP development. Evaluating the capacity of the existing water system and identifying improvements to meet demands, including fire flow, of the current and future population.

**Rainbow Municipal Water District, Hydraulic Water Modeling & Asset Management Plan, Fallbrook, CA. District Engineer.** Providing services for hydraulic water and sewer modeling and development planning. Converted the District's existing hydraulic models to GIS based InfoWater and updated the model to include projects completed since it was developed in 2006. Performing general model updates and calibrating a previously uncalibrated sewer model including performing a flow monitoring study. Providing modeling analysis of the existing system to help the District make informed decisions regarding potential changes to the system. Review of Feasibility Studies and Water Supply Assessments as needed to support the District's review and conditioning of proposed development projects. Reviewed GIS based asset management program for water and wastewater infrastructure based on materials and age.

**Water Utility of Greater Buckeye, Global Water Due Diligence Facilities Report, Buckeye, AZ, Project Engineer.** Responsible for site layout evaluations, inventories, and condition assessments of water source infrastructure. Creating hydraulic models and performing hydraulic analysis for four distinct distribution systems.

**City of San Luis Obispo, Storm Drain Inventory and Condition Assessment, San Luis Obispo, CA. Staff Engineer.** Field inventory and GPS mapping of the City's storm drain system and creation of GIS based mapping. Wrote instruction booklet for future mapping of City's storm drain system.

**Carlsbad Municipal Water District, Hydraulic Water Modeling, Carlsbad, CA. Engineering Manager.** Providing staff support services for hydraulic water modeling and development planning. Performing general model review and analysis of the existing system to help the City make informed decisions regarding potential changes to the system. Review of Feasibility Studies, Water Supply Assessments, and plan checks as needed to support the District's review and conditioning of proposed development projects.

**Lake Arrowhead Community Services District, Water and Sewer Master Plan Updates, Lake Arrowhead, CA. Project Engineer.** Prepared comprehensive water and sewer master plans. Project included hydraulic modeling of the water and sewer systems using H2OMap and H2OMap Sewer, geographical information system update of the entire system, and development of a capital improvement program.

**Eastern Municipal Water District, Water and Sewer Master Plan Updates, Perris, CA. Staff Engineer.** Responsible for conversion of existing H2OMAP hydraulic model to InfoWater software, field testing and calibration of hydraulic model, evaluation of pipeline capacity to deliver current and future demands and Capital Improvement Program prioritization.

**Golden State Water Company, Water and Sewer Master Plan Updates, Multiple Locations, CA. Staff Engineer.** Responsible for coordinating with stakeholders, preparing and conducting a hydrant flow testing plan for model calibration purposes, updating and calibrating the hydraulic model in H2OMap, identifying system deficiencies, creating Capital Improvement Programs, and writing of comprehensive master plan.

**San Diego County Water Authority, Twin Oaks Valley Water Treatment Plant, San Diego County, CA. Field Engineer.** Worked onsite as part of the engineering team during construction of the Twin Oaks Valley Water Treatment Plant owned by SDCWA. Coordinated subcontractors and vendors, put together O&M manuals, coordinated completion of punch list items.

**Rainbow Municipal Water District, Pala Mesa Tank, CA. Project Manager.** Responsible for rehabilitation of aging water and wastewater infrastructure including project management and environmental compliance for a 6MG tank and associated piping and valves, private road rehabilitation, coordination with neighbors, Board of Directors presentations and coordination with the Engineering Committee.

**Rainbow Municipal Water District, Beck Reservoir UV Treatment Facility, Fallbrook, CA. Engineering Manager.** Design of UV treatment system, including localized piping changes, chloramination, and other chemical facilities for 204 MG open potable water reservoir. Total project cost of \$10M. Included coordination with SWRCB Division of Drinking Water and multiple stakeholders including neighbors and Board of Directors.

**Rainbow Municipal Water District, Open Reservoir Covers, Fallbrook, CA. Project Manager.** Design and Construction Services for three open reservoir covers throughout District, including on-site civil design work such as piping and roads. Total project cost of \$10M. Included coordination with SWRCB Division of Drinking Water and multiple stakeholders including neighbors and Board of Directors.

**City of San Diego, San Diego Group Jobs, San Diego, CA, Staff Engineer.** Design services for relocation and replacement of multiple small diameter water and sewer pipelines clustered together geographically, including field services and coordinating with City staff.

**San Lorenzo Valley Water District, Design of Water Line Replacement at Highway 9 and Brookdale Sidehill Viaduct, Boulder Creek, CA. Project Engineer.** Designing 230 LF of 6-inch ductile iron waterline located in Highway 9. Preparing technical specifications for the pipeline, including materials, fittings, services, pipe supports, and abandonment of existing pipeline, as well as locating utilities and coordinating with CalTrans.

**San Lorenzo Valley Water District, Fall Creek Intake, Boulder Creek, CA. Project Engineer.** Verifying the feasibility of relocating intake pumps at the Fall Creek Pumping Station, preparing concept drawings for the relocated intake for stakeholders, and preparing final design drawings for construction. Tasks included preparing a hydraulic model, preliminary cost opinion, and feasibility technical memorandum.

# Christy L. Stevens, PE

## Education

BS, Civil Engineering, California Polytechnic University, Pomona, CA

## Professional Registrations

Professional Engineer - Civil, California, No. C73124

Professional Engineer – Civil, Oregon, No. C91742

Professional Engineer – Civil, Washington, No. C54065

## Certifications

SWRCB Registered D2 Water Operator, No. 41823

SWRCB Registered T2 Water Operator, No. 34939

## Professional Affiliations

Inland Counties Water Association, Member

## Professional Experience

Ms. Stevens has over 12 years of experience working for a public utility and as a consulting engineer, focusing on water and recycled water systems. Her experience includes project management, construction administration, pipeline design, pump station design, hydraulic analysis, water master planning, and capital improvement planning. Her experience allows her to identify and analyze initial project concepts, design distribution components, prepare construction documents, and monitor construction of the project through project completion.

## Representative Projects

### **City of Big Bear Lake Department of Water and Power, 2013 Water System**

**Improvements, Big Bear Lake, CA. Project Engineer.** Prepared design plans, front end and technical specifications and bid phase support for (1) a 1.0 MG welded steel potable water reservoir with site improvements, a 1,500 LF access road and 2,750 LF of 12-inch transmission main; (2) a 100 gpm well pumping plant, which includes a CMU building, site improvements and 5,600 LF of 8-inch transmission main and; (3) a duplex 500 gpm booster station with high pressure bypass and PRV functionality, site improvements and 800 LF of 8-inch transmission main.

### **Big Bear Lake Department of Water and Power, Sawmill Well Pumping Plant, Big Bear Lake, CA. Project Engineer and Construction Manager.**

Providing design services for a 350 gpm well pumping plant, which includes site improvements and a CMU building. Project includes the design of over 600-ft of 6-inch PVC pipeline to connect the new well to the existing distribution system. Following the design phase, WSC will provide construction management services during well construction.

### **Liberty Utilities – Apple Valley, Rincon Road Phases 2 & 3 Water Main Replacement, Compton, CA. Project Engineer.**

Preparing design plans to replace approximately 4,000 LF of 12-inch pipeline in Rincon Road with a 20-inch pipeline. The new pipeline will be located in street right-of-way. The replacement main will be installed within the street right-of-way along with new services, valves, fire hydrants, and tie-ins to the existing water system. The existing mains and customer services will be disconnected from the water system and abandoned in place.

### **City of Victorville, On-Call Water Modeling, Victorville, CA. Project Engineer.**

Providing staff support services for hydraulic water modeling and development planning. Converted the existing hydraulic model to GIS based InfoWater and updated the model to include new projects. Performing general model review and calibrating a previously un-calibrated portion of the model. Providing on-call modeling analysis of the existing system to help the City make informed decisions regarding potential changes to the system. Preparing Feasibility Studies and Water Supply Assessments.

### **Water Master Plan, Victorville Water District, Victorville, CA. Project Manager.**

Managed the preparation of a 20-year comprehensive water master plan and hydraulic model development using H2ONET. Coordinated the collection of data from various departments and worked with the District's engineering consultant to establish reasonable assumptions and criteria as the basis for their work. Reviewed draft deliverables including atlas map updates and conducted internal review meetings to consolidate recommendations and comments from multiple District staff. Coordinated hydraulic model calibration activities, reviewed calibration, and modeling results and attended a general and District-specific training course on the operation and maintenance of the H2ONET hydraulic model.



**Park Water Company, McKinley & 135th Water Main Replacement, Compton, CA. Project Engineer.** Preparing design plans for approximately 1,795 LF 8-inch pipeline and 2,590 LF 12-inch pipeline. The new pipelines will be located in street right-of-way and will replace nearly 3,400 LF of existing water mains that are aging, leaking and difficult to access due to their location in inaccessible backyard easements.

**City of Big Bear Lake Department of Water and Power, 12" Big Bear Blvd Water Main Replacement & 8" Georgia St Distribution Main, Big Bear Lake, CA. Project Engineer and Construction Manager.** Prepared design plans and technical specifications, Caltrans permit support, bid phase support and construction management for 4,000 LF of 12-inch PVC main to replace welded steel water main in Hwy 38 and 250 LF of 8-inch PVC distribution main. Obtained Caltrans permit and coordinated with multiple utility agencies doing work within the same section of roadway in an effort to get multiple projects completed in advance of a Caltrans paving project scheduled for 2017.

**Big Bear City Community Services District, Peter Pan Area Phase 1 and Sheridan Drive Water Main Replacements, Big Bear City, CA. Project Engineer and Construction Manager.** Prepared design plans and technical specifications, permit support, bid phase support and construction management for 9,150 LF of 8-inch PVC main to replace 2-inch and 4-inch cast iron and 4-inch asbestos concrete water mains. Obtained Caltrans and San Bernardino County Public Works permits. The replacement mains will be installed within the street right-of-way along with new services, valves, fire hydrants, air vacs, blow-offs and tie-ins to the existing water system. The existing mains and customer services will be disconnected from the water system and abandoned in place.

**California American Water, Rosemead Reservoir and Booster Pump Station, City of Rosemead, CA. Project Manager.** Managing the permitting and design of the Rosemead Booster Pump Station and Cr(VI) Treatment and will manage the construction of the Rosemead Reservoir, Booster Pump Station and Cr(VI) Treatment. Tasks include preparing the booster station and treatment design rfp, bidding, consultant selection, contract management, and construction management.

**Park Water Company, Stoneacre, et al. Water Main Replacement, Compton, CA. Project Engineer.** Prepared design plans for 5,600 LF 8-inch pipeline and 2,520 LF 12-inch pipeline. The new pipelines will be located in street right-of-way and will replace nearly 5,000 LF of existing water mains that are aging, leaking and difficult to access due to their location in inaccessible backyard easements.

**Victorville Water District, 24" SCLA West Side Water Line, Victorville, CA. Project Manager.** Managed design of pipeline plans and prepared specifications for 16,400 LF of 24-inch DIP including 400 LF of 36-inch jack and bore steel casing beneath Air Expressway. The project provides the Southern California Logistics Airport (SCLA, formerly George Air Force Base) a fully looped system to ensure reliable high pressure water service and fire flow capacity. Acted as resident engineer during construction.

**Nisqualli Road Pipeline Replacement, Phases 1 and 2, Victor Valley Water District, Victorville, CA. Project Manager.** Managed design of pipeline plans and prepared specifications for more than 12,000 LF of 12-inch DIP waterline in conjunction with the City of Victorville's road widening project. The project replaced and upgraded an existing 8-inch AC waterline, which would not have adequate cover under the new road profile. The line size was upgraded to provide improved fire flow for a new industrial customer and accommodate future growth. Tasks included designing connections to the existing water system and tie-overs of existing customer services. Acted as resident engineer during construction phase of the project; tasks included reviewing submittals, responding to RFIs and reviewing and negotiating change orders.

# Spencer J. Waterman

## Education

BS, City & Regional Planning,  
California Polytechnic State  
University, San Luis Obispo

## Certifications

American Water Works  
Association, California-Nevada  
Section, Water Use Efficiency  
Practitioner Grade 1, Certificate  
# 1714

## Professional Affiliations

American Water Works  
Association, Member

## Professional Experience

Mr. Waterman is a planner with an emphasis on water resources planning and water use efficiency. His experience includes development of water master plans, wastewater master plans, recycled water master plans, grant funding applications, water use efficiency and conservation services, and state water law compliance documents including Urban Water Management Plans, AB 1420 Self-Certification Statement materials, and California Urban Water Conservation Council Best Management Practices reports. His planning related experience includes urban redevelopment plans, specific plans, general plans, the CEQA process, ordinance writing, and building permit review.

## Representative Projects

**Northern Cities Management Area Technical Group (NCMA), Engineering Services, San Luis Obispo County, CA. Staff Planner.** Provided as-needed research and analysis support for engineering services for the Cities of Arroyo Grande, Grover Beach, Pismo Beach, and Oceano Community Services District. Research, development of materials, and coordination with Northern Cities agencies and funding agencies for SLO County IRWM funding applications. Research and analysis of water supply and demand data to inform water resources management actions.

**NCMA, Local Groundwater Assistance Grant Program Application Package, San Luis Obispo County, CA. Staff Planner.** Lead author for the grant application to develop a groundwater model for a portion of the Santa Maria Valley Groundwater Basin. Facilitated stakeholder workshops to enhance inter-agency collaboration to develop a competitive grant application meeting all stakeholders' goals and objectives.

**City of Victorville, On-Call Water Modeling, Victorville, CA. Staff Planner.** Providing staff support services for hydraulic water modeling and development planning. GIS and data management to support GIS based InfoWater modeling to help the City make informed decisions regarding potential changes to the system. GIS support for preparing Feasibility Studies and Water Supply Assessments as needed to support the City's review and conditioning of proposed development projects.

**Big Bear Lake Department of Water and Power, Atlas Map Update Services, Big Bear Lake, CA. Staff Planner.** Converted AutoCAD® atlas map into a GIS format to provide a robust platform to support future initiatives (mobile field mapping, hydraulic modeling, CMMS integration, asset management, resource planning, emergency response, etc.). Updated the atlas map using as-built information, atlas map markups, and a pipeline inventory database from BBLDWP staff.

**City of Paso Robles, 2014 Water Master Plan Update, Paso Robles, CA. Staff Planner.** Contributing author for the 2014 Water Master Plan Update. Used GIS to spatially allocate demands for current and future timeframes through buildout for incorporation into a hydraulic model. Developed land use demand factors based on current development and projected land use of each parcel and development at buildout.

**City of Grover Beach, Funding and Financing Support, Grover Beach, CA. Staff Planner.** Researched and summarized viable funding programs for water system improvements to be implemented in conjunction with a street rehabilitation program. Prepared a matrix of key criteria for multiple funding programs including eligible and ineligible reimbursement costs, funding eligibility requirements, funding amounts and limits, application and disbursement schedule, and compliance requirements.

**City of Arroyo Grande, City of Arroyo Grande Capital Improvement Plan for the 2011 Water and Sewer Master Plan Updates, Arroyo Grande, CA. Staff Planner.** Developed 20 year per capita water use projections within the City service area boundary in accordance with California Senate Bill x 7-7. Developed spatially allocated demands for current and future demands through buildout using GIS for incorporation into a hydraulic model. Developed land use demand factors based on current development and projected land use and zoning of each parcel at buildout.

**City of Santa Maria, 2012 Utilities Master Plan Update, Santa Maria, CA. Staff Planner.** Contributing author for the 2012 Utilities Master Plan Update. Developed spatially allocated demands for current and future demands through buildout using GIS for incorporation into a hydraulic model. Developed land use demand factors based on current development and projected land use and zoning of each parcel at buildout.

**City of Camarillo, Project Management Services, Camarillo, CA. Staff Planner.** Mapped recycled water system information in GIS and helped develop Site Use Reports to support construction management of new customer services, setup of recycled water user agreements, and coordination with the Division of Drinking Water to ensure compliance. Developed report content and graphics to support posting of recycled water warning signage, appropriate infrastructure coloring, and applicable training of responsible individuals.

**San Miguelito Mutual Water Company, Chevron Tank Farm Service Extension Feasibility Study-Phase 1, Avila Beach, CA. Staff Planner.** Assessed the capacity of the SMMWC's water and wastewater systems under current and future conditions, including the inclusion of a proposed development at the Chevron Tank Farm. Developed water and wastewater base maps in GIS and conducting an analysis of demand, supply, capacity and storage. Developed demand and loading estimates. Analyzed the projected water demand and wastewater loading from the proposed development and compared against existing demand/loading factors and the system capacity. Prepared a TM that describes the existing systems, proposed growth and recommendations completing future phases of the project.

**City of Arroyo Grande, On-Call Engineering Services. Staff Planner.** Provided as-needed research and analysis support for engineering services. Research, development of materials, and coordination with other agencies regarding water supply and demand data to inform water resources management actions. Developed monthly Water Status Updates.

**Avila Beach Community Services District, Water Resources Analysis, Avila Beach, CA. Project Manager.** Prepared draft technical memorandum for ABCSD. Evaluation and assembly of water resource reliability data, supply and demand characterization, and conditional dry and average supply and demand comparison information.

**Multiple Agencies, Urban Water Management Plans, CA . Project Manager.** Prepared nearly 30 UWMPs during the 2010 and 2015 cycles to fulfill the requirements of the UWMP Act. Developing 20 year per capita water use projections in accordance with California Senate Bill x 7-7. Evaluating and updating supply, supply reliability, demand, supply and demand comparison, demand management measures and the water shortage contingency plan components of the UWMP.

**Apple Valley Ranchos Water Company, Water System Improvement Plan, Town of Apple Valley, CA. Staff Planner.** Evaluated the capability and reliability of the water distribution system to meet current and projected demands and fire flow requirements. Developed spatially allocated existing and projected demands and performed a preliminary parcel screening to identify potential tank and booster stations sites. Developed land use demand factors based on current demands in the service area, compared industrial land use demand factors for several other water utilities in CA, and applied them to the projected land use of each parcel at buildout to generate spatially allocated demands at buildout.

### Summary of Experience

Mr. Ballman is a leader in applying innovated solutions modeling the movement of water – in streams, rivers, and wetlands – relative to ecological function. Mr. Ballman regularly works with multiple-stakeholders on restoration projects and is known for successfully navigating permitting needs and facilitating collaboration amongst stakeholders. He leads the technical direction of Balance’s 1D and 2D modeling efforts for fluvial and floodplain restoration projects, this work may include alternative analysis, modeling shear stresses, fish passage, depth analysis – relative to habitat needs, sediment studies, and water quality. Additionally, Mr. Ballman leads Balance’s model calibration program – integrating real-time flow and sediment measurements for model calibration and verification. He also directs the development of complex plansets for stream, floodplain, and wetland restoration design including structural and biotechnical approaches. Lastly, he prepares floodplain analyses including LOMRS, CLOMRs and related documents supporting wetland and habitat restoration permitting.

Responsible for the development and application of computer models to all levels of water resource problems. Directs Balance’s efforts in the fields of urban stormwater management including mitigating impacts related to both quantity and quality, and carries out statistical analyses of hydrologic data to support current design work. Prepares floodplain analyses including LOMRS, CLOMRs and related documents supporting wetland and habitat restoration or permitting. Assists in channel-stability and stream restoration efforts. Supports stream gaging, well-monitoring and other hydrographic functions performed by Balance.

### Relevant Experience

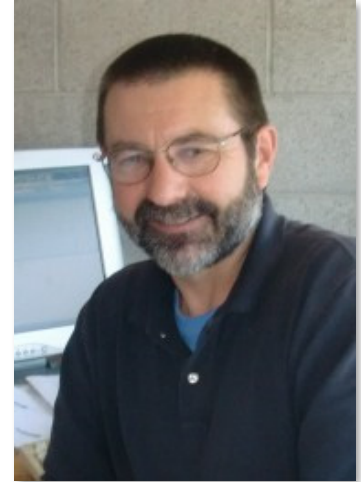
**Stormwater Management and Flood Control Planning Assistance for Alameda Point, City of Alameda, Alameda County, California.** Mr. Ballman was the project manager for Balance’s role for this project. Efforts included C.3 compliance, stormwater strategy, flood control and sea level rise. The site presented challenges due to project location and the impact of high tides, causing localized flooding, Balance provided an innovative stormwater management approach. In addition, Balance addressed FEMA requirements.

**Updated Flood Control Project Report for County Services Area 50, Monterey County, California.** Mr. Ballman was the principal-in-charge overseeing the technical approach for this Flood Control project. Balance staff conducted 1D hydraulic modeling for a range of existing and proposed physical floodplain changes near the project area. Additionally, Balance assessed the interior drainage functionality of CSA-50 and designed flood control components to remove the area out of the floodplain, per FEMA regulations.

**500 Pittsburg Flood Control Planning, Richmond, Contra Costa County, California.** Mr. Ballman was the principal-in-charge for this project to prepare levee enhancement plans to be incorporated into the ongoing permit approval process that Contra Costa County Flood Control District (Flood Control) is pursuing with the

### EDWARD D. BALLMAN, P.E.

Principal Engineer



### Education:

M.E. Environmental Water Resources,  
Department of Civil and  
Environmental Engineering,  
University of California at Berkeley,  
1998

B.Ch.E. University of Minnesota,  
1982

### Registered Professional Engineer:

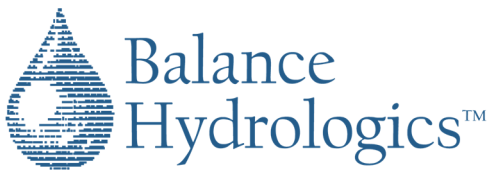
California #64095

### Certified Professional in

**Stormwater Quality: CPSWQ**  
#0379

### Professional Affiliations:

Floodplain Management Association  
American Society of Civil Engineers



resource agencies (primarily the U.S. Army Corps of Engineers' San Francisco office). Balance provided a design for the flood protection infrastructure with the appropriate tie-ins to high ground to provide the necessary level of protection for the proposed project on the western and eastern corners of the property, adjacent to Wildcat Creek.

**Upper Petaluma River Watershed Flood Control Project Feasibility Study, Sonoma County Water Agency, Sonoma County California.** Mr. Ballman is the principal-in-charge for this project where Balance is the lead for hydrologic and hydraulic modeling for the Upper Petaluma River Watershed Flood Control Project Feasibility Study being carried out by the Sonoma County Water Agency. The overarching goal is to identify, screen, and select candidate projects that can provide real flood control benefits while simultaneously increasing groundwater recharge, enhancing wildlife habitat, and providing recreational benefits. The project will include continuous simulation hydrologic modeling of watershed runoff and non-steady state hydrodynamic modeling of stream channels at selected sites, calibrated and validated using a real-time stream gauging system. The modeling output will be used to frame potential project benefits and provide preliminary design information to inform baseline project cost calculations.

**Carmel River Floodplain Restoration and Environmental Enhancement, Monterey County, California.** Mr. Ballman served as Principal Engineer for the floodplain restoration and flood control engineering component for this multi-year project carried out by the County of Monterey and the Big Sur Land Trust. Project goals include removal of extensive reaches of levees along the south bank of the Carmel River within the iconic Highway 1 corridor, grading and habitat enhancement features for the multi-channel restored floodplain, and geomorphically appropriate transitions to the lagoonal environment that borders the west boundary of the site – goals were successfully met using 2-D hydraulic modeling.

**City of Berkeley Hydrologic Modeling and Storm Drain System Master Planning, Alameda County, California.** Mr. Ballman was the Principal Engineer and Senior Reviewer for hydrologic models of the Codornices Creek and Potter Creek watersheds developed by Balance engineers. The models developed use the U.S. EPA Storm Water Management Model (SWMM) within the GIS-based MIKE-URBAN platform. The models incorporate urban and non-urban watershed hydrology, open channel and pipe network hydraulics, dynamic and kinematic flow routing, flood storage, and overflow routing. A gaging program was initiated in winter 2009-10 to collect data needed to support verification and calibration of the models.

**FEMA Letter of Map Revision, Cypress Knolls, City of Marina, Monterey County, California.** Mr. Ballman was the Principal-in-Charge for this effort to update FEMA flood hazard mapping for one of the largest flood storage areas in the City of Marina. The map revision work was needed to reflect anticipated land use changes associated with infrastructure improvements as part of the Fort Ord base conversion process. Mr. Ballman performed QA/QC of the hydrologic modeling to quantify the expected flood volumes that would be routed to the storage basin. The completed work was summarized in a Letter of Map Revision request that was reviewed and approved by FEMA.

**University Villages Stormwater Infrastructure Design, City of Marina, Monterey County, California.** Mr. Ballman was the Principal-in-Charge for this effort, which included a hydrologic model of the proposed infiltration system that was a key component of the value engineering that was applied to reduce the overall cost of the infrastructure, while still meeting all requirements of the Fort Ord Reuse Authority. University Villages is one of the important redevelopment projects associated with the conversion of the Fort Ord military base to civilian uses. Balance Hydrologics was originally brought into this project by the developer to provide peer review services for stormwater planning. The scope of work eventually included working with the lead project civil engineer to design underground stormwater facilities capable of detaining and infiltrating runoff from storms up to the calculated 100-year recurrence interval event.

**East Garrison Fort Ord Hydrologic Modeling, Monterey County, California.** As Principal-in-Charge, Mr. Ballman provided QA/QC of a complex hydrologic model used to develop an infiltration based stormwater management scheme for a 244-acre residential development. This effort resulted in the design of a series of interconnected infiltration basin and other distributed infiltration facilities that are capable of infiltrating runoff up to the 100-year design storm.



## Summary of Experience

Teresa Garrison is professional civil engineer with a focus on environmental engineering. Teresa specializes in water resources and water quality treatment with natural systems. Her previous projects in the water resources field include onsite water treatment systems (waste, grey, and drinking water), hydrologic and hydraulic modeling of surface runoff, natural treatment systems, stormwater pollution prevention and erosion control plans. Teresa's restoration projects including stream stabilization for architectural remains and habitat enhancement for the California Red Legged Frog. Civil site development and infrastructure skills include site development of roads, parking lots, and utility infrastructure, complete with AutoCAD plans and specifications.

Teresa has vast experience with water quality testing, and assisted with water quality lectures and labs at Humboldt State University. She has work with Arcata Wastewater Treatment Facility, as part of the Arcata Marsh Research Institute. She developed technical reports and management strategies for improving the water quality and treatment efficiency of natural treatment systems.

Teresa's work experience along with her continued education has given her a scientific background to understand water quality and natural treatment systems. She has a passion to learn new things, and apply her experience and expertise to provide innovative solutions to engineering design problems.

## Relevant Experience

**SCVHA, San Felipe Creek Restoration, Santa Clara County, California.** Hydrologic analysis of San Felipe Creek and preliminary design of restoration techniques to repair and enhance the creek and surrounding ecosystem. Mrs. Garrison worked on the engineering plans and worked with staff geomorphologist on overall site design.

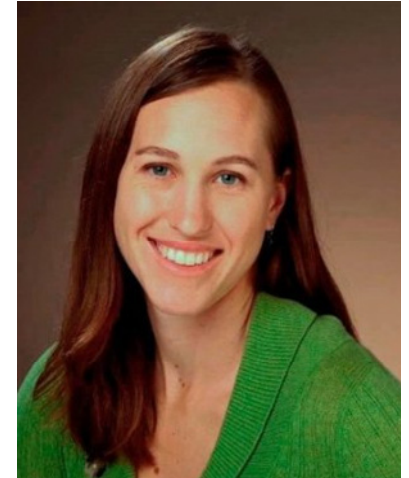
**Operations and Maintenance Manual for the Barrington DA52C Detention Basin, City of Brentwood.** Write and work with Flood Control on the O&M Manual for the stormwater detention basin as part flood reduction strategies and general maintenance of stormwater infrastructure.

**Stormwater Planning, Placer County Government Center Master Plan Update, Placer County, California.** Area wide stormwater modeling with XP Strom computer software to evaluate existing conditions and identify areas for improvements that could be addressed in the Place County Government Center Master Plan. The project modeled improvement alternatives to evaluate the stormwater storage requirements for the master plan updates and presented feasible solutions that incoming development could use to meet the current stormwater regulations.

**Truckee River Water Quality Monitoring Program, Town of Truckee and Placer County, Nevada and Placer Counties, California.** Ms. Garrison assists with implementation and adaptive management of the Truckee River Water Quality Monitoring Program to address the effectiveness of the Middle Truckee River sediment TMDL. The modifications are intended to be more consistent and

## Teresa Garrison, P.E.

Environmental Engineer &  
Hydrologist



## Education:

M.S. Environmental Systems,  
Humboldt State University,  
California, 2011

B.A. Environmental Resources  
Engineering, Humboldt State  
University, 2009

## Registered Professional Engineer:

California #84034

## Qualified Stormwater Developer and Practitioner QSD/QSP:

California # 26493

## Professional Affiliations:

Society of Wetland Scientist  
California Stormwater Quality  
Association

## Certifications:

Certified Wetland Hydrologist



comparable with: 1) Methods developed and implemented by the Truckee River Watershed Council; 2) Analyses used by the Desert Research Institute and the Lahontan Regional Water Quality Control Board to develop the TMDL; and 3) Accepted practices developed by the U.S. Geological Survey for developing sediment loading estimates using near-continuous turbidity monitoring equipment. Work on this project is being carried out as subcontracted to CDM-Smith.

**Stormwater Management, Cowan Ranch Development, Antioch, Contra Costa County, California.** Conducted the stormwater drainage analysis and modeling for the proposed Cowell Ranch Development. The development requires water quality treatment, hydromodification and flood control, which was modeled to meet the current regional and state requirements. Specifically, the San Francisco Bay regional C.3 requirements under the California implemented State General Permit (NODES permits). The stormwater management system was designed using a progressive split basin approach which provided the required stormwater storage with a smaller bioretention area footprint.

**Stormwater Drainage Modeling and Stormwater Management Plan, Roberts Ranch Development, Castro Valley, California.** Working with the projects main civil engineers on the stormwater systems and evaluating/modeling the design for regional and state requirements. Water quality and hydromodification were modeled through the Bay Area Hydrology Model and peak flows for flood control were modeled with the US Army Corps of Engineers HEC-HMS model. The design provided stormwater treatment through bioretention areas and storage with underground pipes. As part of the project a Stormwater Management Plan was prepared.

**Stormwater Drainage Modeling, Cowell Ranch, City of Brentwood, California.** Hydrologic and hydraulic modeling of the flow-duration control performance of the stormwater infrastructure at the proposed development. Provided hydrologic modeling support to assist in sizing the proposed stormwater facilities that will provide control of runoff quality and quantity to meet the prevailing requirements in the Municipal Regional Stormwater Permit and assess whether those facilities can control peak runoff rates using design storm events from the Contra Costa County Flood Control and Water Conservation District.

**Stormwater Drainage Modeling, Warm Springs East, City of Fremont, California.** Hydrologic and hydraulic modeling of the flow-duration control performance of the stormwater infrastructure at the proposed development. Working with the main civil engineers to evaluate the stormwater infrastructure and present feasible solutions for sizing the stormwater detention and treatment components of the stormwater infrastructure to meet the current local and Municipal Regional Stormwater Permit requirements.

**Stormwater Drainage Peer Review, Sierra Drive Residential Development, Town of Truckee, Placer County, California.** Conducted a peer review of the stormwater drainage design for hydrologic and hydraulic components for a proposed development site. The peer review evaluated the proposed design for accuracy and the designs ability to meet the town and Lahontan Regional Water Quality Control Board stormwater requirements for water quality and flow-duration control.

**Stormwater Detention and Wetland Treatment System, Rangiora, New Zealand.** Working with the City Council and land developer to design a stormwater wet pond and treatment wetland for a subdivision as part of the Land Use Regional Plan requirements.

**Inland Port Water and Wastewater System, Rolleston, New Zealand.** Design and modeling of the reticulated water supply system under both temporary, restricted, supply and for full project build out. Design of the wastewater collection and conveyance system, including stormwater first flush capture for pollution control.

**Washington Union School Drinking Water Pilot Study, Washington Union Public School District, Salinas, California.** While working with Fall Creek Engineering, a yearlong grant funded pilot study was conducted to test treatment methods for arsenic, cadmium, iron and manganese removal from the water supply well at a public school. The pilot study successfully demonstrated that an oxidation-coagulation-filtration system could reduce arsenic and cadmium to less than 50% of the State MCL for these parameters.

# Kendall Stahl, MS, EIT

## Education

MS, Civil and Environmental Engineering, University of Adelaide

BS, Environmental Engineering, California Polytechnic State University, San Luis Obispo

AA, Mathematics – Physics, Allan Hancock College

## Professional Registrations

Engineer in Training, No. 1560998

## Professional Experience

Ms. Stahl is an Engineer-in-Training with environmental engineering specializing in hydrology and hydraulics analysis and water resources planning. She has experience in water quality assessment and groundwater contamination analysis, designing water treatment systems, water resources engineering, and flood modeling. Her graduate studies focused on water security analysis, water demand management optimization, with an emphasis on characterizing the drivers of household water demand.

## Representative Projects

**Northern Cities Management Area Technical Group, Engineering Services. Staff Engineer.** Provided as-needed engineering services for the City of Arroyo Grande, City of Grover Beach, City of Pismo Beach, and the Oceano Community Services District. Coordinated monthly meetings of the Northern Cities Management Area Technical Group. Interfaced with local and statewide regulatory agencies as an authorized agent of the Northern Cities. Updating monthly groundwater production report and database, and developing a comparison summary of annual reports from the NCMA and the NMMA.

**City of Pismo Beach, Regional Groundwater Sustainability Project, Pismo Beach, CA. Staff Engineer.** Providing Program Management, Preliminary Design, Funding, and Environmental Document Support services for the Indirect Potable Reuse project that will recover secondary effluent from the City of Pismo Beach and the South San Luis Obispo County Sanitation District's wastewater treatment plants, a resource currently discharged to the Pacific Ocean. The advanced treatment facility will use microfiltration or ultrafiltration, reverse osmosis, and ultraviolet radiation and advanced oxidation process before being injected into the Santa Maria Groundwater Basin to supplement groundwater supplies and protect the basin from seawater intrusion. Construction is expected to begin in 2019.

**City of Arroyo Grande, GSA Formation, Arroyo Grande, CA. Staff Engineer.** Support the City in preparing a Groundwater Sustainability Agency (GSA) formation notification for the California Department of Water Resources for the intent to undertake sustainable groundwater management in accordance with the Sustainable Groundwater Management Act. The GSA formation notification included the preparation of boundary maps, stakeholder lists, and support coordination with adjacent local agencies forming a GSA.

**Avila Beach Community Services District, Water Resources Analysis Technical Memorandum, Avila Beach, CA. Staff Engineer.** Prepared a draft TM for the District. Evaluated and assembled water resource reliability data, supply & demand characterization, and conditional dry and average supply and demand comparison information.

**City of Pismo Beach, 2015 Water Master Plan Update, Pismo Beach, CA. Staff Engineer.** Utilized the calibrated hydraulic model of the City's water distribution system using Bentley's WaterGEMS software to produced fire flow visuals for future buildout scenarios and opportunities to optimize operations.

**City of San Luis Obispo, Capacity and Connection Fee Study, San Luis Obispo, CA. Staff Engineer.** Performed a lift station life cycle energy cost and savings analysis to update the City's 2013 water and sewer impact fees development data. Evaluate the energy cost associated to lift stations and catchment cost savings from reduced sewer inflow and infiltration reduction. Developed unit hydrographs for 10-year, 24-hour storm event to model program and infrastructure renewal strategy.



## Heather Freed, EIT, MS

### Education

MS, Civil and Environmental  
Engineering, Cal Poly, San Luis  
Obispo

BS, Environmental Engineering,  
Cal Poly, San Luis Obispo

### Professional Registrations

Engineer in Training, No. 154611

### Professional Experience

Ms. Freed is an Engineer-in-Training with experience in water and wastewater distribution and treatment systems. She has experience evaluating various hydraulic measures including headloss through pipes, hydraulic jumps, and groundwater pumping. Her knowledge also includes groundwater contamination, water chemistry and water quality measurements, physio-chemical and biological water and wastewater treatment, and climate change and energy intensity analysis.

### Representative Projects

**Casitas Municipal Water District, Water Master Plan and Capital Improvement Plan, Ojai, CA. Staff Engineer.** Conducting a condition-based assessment and developing a Water Master Plan for the new owner of the Ojai water system. Tasks include developing opinions of probable cost for recommended projects, and evaluating production and consumption data to develop projections and recommend improvements necessary to maintain a safe and reliable level of service. Developing, calibrating, and utilizing hydraulic model of the system in conjunction with GIS datasets to improve system operations and CIP development. Evaluating the capacity of the existing water system and identifying improvements to meet demands, including fire flow, of the current and future population.

**City of Pismo Beach, 2015 Water Master Plan Update, Pismo Beach, CA. Staff Engineer.** Performed an update of the City's 2004 Water Master Plan. Created and calibrating an all-pipes, spatially allocated demand hydraulic model of the water distribution system using Bentley's WaterGEMS software. Utilized the hydraulic model to evaluate capacity limitations for current and future buildout scenarios and opportunities to optimize operations. Developed condition based-replacement plans for aging infrastructure and an updated CIP project list to prepare for budget planning.

**Camp Roberts, Phase I Construction Support, Commissioning, and Phase II Design for The Main Garrison Wastewater Treatment Plant, Engineering Support.** Developing an infrastructure and operational evaluation of Camp Roberts Army Base water production, water distribution system, and wastewater treatment facilities. The Camp Roberts Main Garrison WWTP is in the process of upgrading their facility to achieve compliance with their new wastewater discharge permit requirements.

**City of Paso Robles, Hillcrest Drive Waterline Design, Paso Robles, CA. Staff Engineer.** Project includes the design and replacement of 700 LF of existing 4-inch asbestos cement (AC) water mains with new 8-inch PVC pipe along Hillcrest Drive.

**City of Paso Robles, Hillcrest Drive Water Modeling, Paso Robles, CA. Engineering Support.** Conducted a fireflow analysis for the 12<sup>th</sup> St. Zone with pipeline upgrades on and around Hillcrest Drive. Evaluated multiple scenarios to optimize the fire flow at buildout and maximum daily demand water use in the 12<sup>th</sup> St. Zone for the lowest cost. Prepared cost calculations and a technical report with the findings.

**West Valley Water District, Lytle Creek Ranch Water Development, Rialto, CA. Engineering Support.** Included updating the Water Facilities Study for the Lytle Creek Ranch Development, including verifying design criteria, demand projections, supply facilities, infrastructure facilities, and the facility requirements. Conducted a financial analysis and updated the previously developed report.

**City of Arroyo Grande, 2015 Urban Water Management Plan, Arroyo Grande, CA. Engineering Support.** Developing demand management recommendations to support 2015 UWMP.

## Kaylie N. Ashton, EIT

### Education

BS, Civil Engineering, California  
State Polytechnic University,  
Pomona, CA

### Professional Registrations

Engineer-In-Training,  
#153695

### Professional Experience

Ms. Ashton is an Engineer-In-Training. Her experience includes water pipeline design, hydrology and hydraulic analysis, water and recycled water master planning, hydraulic modeling of water distribution systems and construction administration. Through her experience, she has developed a practical understanding of how to apply engineering practices to deliver insightful and operator-friendly projects.

### Representative Projects

**Big Bear Lake Department of Water and Power, Sawmill Well Pumping Plant, Big Bear Lake, CA. Engineering Support.** Provided design services for a 350 gpm well pumping plant, which includes site improvements and a CMU building. Project included the design of over 600-ft of 6-inch PVC pipeline to connect the new well to the existing distribution system. Following the design phase, WSC provided construction management services during well construction.

**City of Pismo Beach, Water Main Replacement Project, Pismo Beach, CA. Staff Engineer.** Performed an alternatives analysis to determine the preferred alternative to improve fire flow and service pressure to a portion of the system with small dead-end mains and low static pressure. Hydraulic analysis was performed using the existing hydraulic computer model in WaterGEMS. Prepared design plans and technical specifications for 1,750 ft of 8-inch pipeline, including a PRV station and 21 water service tie-overs.

**Liberty Utilities/Park Water Company, Water Main Replacement Projects, Compton, CA. Staff Engineer.** Assisting in preparing design plans for 17,450 LF of 8-inch and 12,165 LF of 12-in pipeline. The new pipelines were located in street right-of-way and replaced existing water mains that were aging, leaking and difficult to access due to their location in inaccessible backyard easements.

**South San Luis Obispo County Sanitation District, Complete Recycled Water Facilities Planning Study for a Satellite Water Resource Recovery Facility, Grover Beach, CA. Staff Engineer.** South San Luis Obispo County Sanitation District's (SSLOCS) current wastewater treatment plant does not meet redundancy requirements, therefore SSLOCS is looking into the opportunity in adding an additional treatment plant and using the effluent as reuse. Prepared potential alternatives and cost estimates for an investment analysis which will be included in the Recycled Water Facilities Planning Study.

**City of Big Bear Lake Department of Water and Power, 2013 Water System Improvements, Big Bear Lake, CA. Engineering Support.** Assisted in the preparation of design plans and specifications as well as hydrology analysis for the Angel's Camp Reservoir, a 1.0 MG welded steel potable water reservoir. The project includes design of a 1,500 LF paved access road and 2,750 LF of 12-inch transmission main. Assisted with design plans for the Arrastre Creek Well Pumping Plant, which includes a pump station, CMU building, site improvements, and 5,600 LF of 8-inch transmission main.

**City of Victorville, On-Call Water Modeling, Victorville, CA. Staff Engineer.** Updated the City's GIS based InfoWater water model to include new projects since 2009 and current operations. Calibrating the Southern California Logistics Airport portion of the model and performing a high level review of the model. Provide on-call modeling analysis to help the City make informed decisions regarding potential changes to the system. Preparing Feasibility Studies and Water Supply Assessments as needed to support the City's review and conditioning of proposed development projects.

# APPENDIX A:

## RESUMES



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