TO: **James L. App, City Manager**

FROM: **Doug Monn, Public Works Director**

SUBJECT: **Water System Master Plan**

DATE: **February 4, 2014**

NEEDS: For the City Council to consider awarding a contract for the preparation of a 2014 Water Master Plan

FACTS:

1. A Water System Master Plan (WMP) is a comprehensive assessment of the City's ultimate needs for water supply, storage, and distribution infrastructure.
2. The WMP evaluation considers future population growth, land use, and water quality (e.g. water age and disinfection byproduct formation potential).
3. The WMP is the primary tool used to assess the fire-fighting capacity of the water system and determine the most cost-effective methods mitigating deficiencies.
4. The existing 2007 WMP was developed without the benefit of our recently developed GIS water atlas. This accuracy of the GIS atlas will greatly enhance the water system hydraulic modeling effort.
5. The updated plan will include significant changes in production and distribution (e.g. Nacimiento Water Treatment Plant)
6. The WMP will allow the City to identify future capital improvements necessary to remedy existing system deficiencies and provide for future growth.
7. The capital improvements plan developed as part of this effort is necessary to ensure water rates and connection fees are adequate to fund necessary capital projects.
8. The City issued an RFP in late December and two firms responded. WSC was both the top ranked and lowest cost proposer.

ANALYSIS & CONCLUSION:

The City of Paso Robles currently provides potable water service to a population of 30,500 through approximately 10,700 water service connections. The City's water production facilities consist of Salinas River Underflow wells (7 wells) and deep wells that pump from the Paso Robles Groundwater Basin (12 wells). The City will soon be incorporating surface water into its overall supply portfolio. A Phase 1 surface water treatment plant having a capacity of 2.4 million gallons a day (MGD) is planned to be brought into service by summer 2015. A 4 MGD Phase-2 surface water treatment plant is planned in the future to enable the City to fully utilize its surface water supply.

The planning horizon for this study is 30 years, which corresponds to the expected time-frame required for build-out of the City's current General Plan area. The City's expected population at build-out is 44,000.

The key elements to the proposed Water Master Plan Include:

1) Develop a hydraulic water system model based on the City's latest GIS data bases
2) System Capacity Analysis

Analyze the existing system under peak-day plus fire-flow conditions to determine system deficiencies.

Analyze new water system improvements (i.e. major transmission, storage, production, and pumping facilities) needed to provide service to currently undeveloped areas of the City based on lands use (zoning) designations and specific development plans where available.

Evaluate System at present, 5-year, 10-year and build-out.

3) Operational Analysis

Determine operational modifications and/or capital improvements to the existing system to provide a more reliable system, including improvements needed to meet current and anticipated water quality regulations and mitigate potential taste and odor issues.

4) Capital Improvement Plan

Develop short-term and long-term improvements, including costs, priorities, and completion dates for necessary improvements. This should include the capital projects necessary to meet established criteria for demands projected at present, 5-year, 10-year and build-out conditions. Evaluate age and condition of water-system key assets and recommend a depreciation schedule and timeframe for replacement.

POLICY REFERENCE: Economic Strategy; Integrated Water Resource Plan

FISCAL IMPACT: WSC proposes professional engineering-design services for a total cost of $112,675. Due to the complexities involved in modeling and calibrating city-wide potable water systems scope amendments may be necessary as water issues surface throughout the course of this project. Therefore, staff is requesting a 15% contingency ($16,901) be included.

Contract Amount:	$112,675
15% Contingency:	$16,901
Total Amount:	$129,576

The Current Water fund Balance is $17.962M and award of this contract will reduce this amount to $17.832M

OPTIONS:

a. Adopt Resolution No. 14-xx authorizing the City Manager to enter into a contract with WSC in the amount of $112,675 to provide professional engineering design services associated with the preparation of a Water Master Plan.

b. Amend, modify, or reject the above option.

Prepared by: Christopher Alakel, P.E.
Water Resources Manager

Attachments
1) Resolution
2) WSC Scope of Work

ATTACHMENT 1

RESOLUTION NO. 14-xxxx

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PASO ROBLES AWARDING THE CONTRACT FOR THE PREPERATON OF A WATER MASTER PLAN

WHEREAS, Significant Changes have occurred in the City's water distribution system that are not reflected in the City's existing Water Master Plan; and

WHEREAS, A Water Master Plan is the primary tool used to identify infrastructure deficiencies; and

WHEREAS, Water Master Planning is necessary to develop a capital improvement plan; and

WHEREAS, A capital improvement plans is necessary to evaluate sufficiency of existing water rates.

NOW, THEREFORE, BE IT RESOLVED, AS FOLLOWS:

SECTION 1 The City Council of the City of El Paso de Robles does hereby appropriate $129,576 from Water Operations and authorize the City Manager to sign a contract with WSC for the preparation of a 2014 Water Master Plan.

PASSED AND ADOPTED by the City Council of the City of Paso Robles this 4th day of February, 2014, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

Duane Picanco, Mayor

ATTEST:

Caryn Jackson, Deputy City Clerk

WSC
WATER SYSTEMS CONSULTING, INC.

12/20/2013

Mr. Christopher Alakel, PE
Water Resources Manager
City of Paso Robles
1000 Spring Street
Paso Robles, CA 93446

SUBJECT: PROPOSAL TO UPDATE THE WATER SYSTEM MASTER PLAN FOR THE CITY OF EL PASO DE ROBLES

Dear Christopher,

The City of Paso Robles, and in particular, you as the Water Resources Manager, has a responsibility to the people of Paso Robles to provide safe, reliable drinking water, at a fair and reasonable price. You and your staff face many challenges as you deliver water to your customers. The City is facing declining groundwater levels and fights over water rights. The City has responded by seeking additional sources of water, reducing municipal consumption and managing pumping from the deep aquifer. The City has a variety of groundwater quality issues. The City has responded by implementing cost effective well head treatment and blending strategies. The City has suffered with occasional high water losses and non-revenue water. The City has responded by aggressively seeking leaks, illicit connections, and non-metered fire hydrant uses. There is a pattern here, and that is to identify a problem and then actively plan and implement solutions to those problems.

The City is now bringing on a new source of supply with the Nacimiento Water Treatment Plant Project. That means there are potential water quality and DBP formation issues in the distribution system. The City experienced a water main break and realized the risk to the City from catastrophic water main failures. The City is facing renewed growth activity and requests for service. The response is now to plan for these problems and then implement the solutions. The Water Master Plan Update will give the City the tools to prepare for all of these issues. The capacity assessment will identify current and future deficiencies. The preliminary water age modeling will set the stage for future water quality modeling. The hydraulic model and initial condition assessment will provide the foundation for a comprehensive asset management plan. With these plans in place, the City will be ready to act.

Through our extensive experience preparing master plans throughout California and the western United States, WSC has developed methodologies to produce accurate, reliable and user-friendly water models that extend beyond the master planning process and becoming integral tools for the operation and maintenance of a water utility. We have reviewed the City's GIS data, collaborated with City Staff and have developed an approach that will allow the City to leverage of all of the hard work invested in developing updated GIS datasets and realistic estimates of future water demand to produce a Water Master Plan that will help guide the City for the next 10 years.

We welcome the opportunity to discuss this proposal with you in more detail, and to answer any questions you may have. Feel free to contact Jeff at (805) 457-8833 ext. 101 or Josh at ext. 107. You can also email us at jszytel@wsc-inc.com and jreynolds@wsc-inc.com. Our office is just minutes away, and we would be happy to meet with you in person as well.

Thank you again for this opportunity, and we look forward to your response.

Sincerely,

Water Systems Consulting, Inc.

Jeffery M. Szytel, PE, MS, MBA
President / CEO

Josh Reynolds, PE
Project Manager

*The proposed services will remain valid for 60 days after submission. WSC has no conflicts of interest that exist in the provision of these services.

Table of Contents

Executive Summary

WSC is Your Team for the Water System Master Plan

WSC is the premier water and wastewater engineering firm on the Central Coast. We have established a reputation for providing high quality and responsive service, and we have delivered more than 10 directly relevant water planning projects on the Central Coast in the last three years. WSC's team is led by Joshua Reynolds. Josh has worked with the City of Paso Robles (City) for more than seven years, and is supported by a team of experts that specialize in municipal water and sewer system planning. Josh, along with the rest of the WSC team, is excited about the opportunity to continue to work with the City, and we are prepared to exceed your expectations on this project.

Why Choose WSC?

The City has a choice to make when selecting your team for the Water System Master Plan. We hope WSC stands out, and here are some of the reasons why we think we will:

- **Unmatched Experience.** WSC is involved in multiple recent and relevant water and/or wastewater planning projects along the Central Coast, including similar projects for the Cities of Paso Robles, San Luis Obispo, Santa Maria, Arroyo Grande, Santa Barbara, and Pismo Beach among others. Our cohesive local team of water planning experts eliminates the need for a costly and time consuming education process, and our directly relevant qualifications build confidence in our work products.
- **System insight.** WSC has teamed with Todd Engineers to closely integrate water demand projections with recent City efforts. Todd Engineers completed the City's 2005 and 2010 UWMP's and is very familiar with the City's current water supply and demand projections. Todd Engineers is also completing multiple Water System Assessments for the City. Furthermore, WSC has recently utilized the existing water model to analyze the vulnerability in the City's distribution system. We know your systems and are intimately familiar with the local context, which makes us a reliable partner for this critical plan update.
- **Reliable, local partner.** Josh has been working for the City for seven years, and WSC has demonstrated our reliability and responsiveness to the City on the recent water system hydraulic modeling tasks. WSC is committed to the City long-term, and brings full service capability combined with unmatched client service to help the City succeed.

Firm Identification

Water Systems Consulting, Inc.

Water Systems Consulting, Inc. (WSC) is a civil and environmental engineering firm that specializes in the planning, design, evaluation and optimization of municipal water, wastewater, recycled water systems and water resources. From our offices in San Luis Obispo, Inland Empire, Carmel Valley, and San Diego, WSC serves special districts, cities, counties, investor owned utilities and regulatory agencies throughout California, and we have a strong understanding of the regulatory and political climate that our clients operate within. WSC works collaboratively with our clients, applying proven approaches, state-of-the-art tools, and expertise-driven innovation to deliver truly outstanding results.

WSC's Principal-in-Charge is also WSC's Founder and President, Mr. Jeffery Szytel. Mr. Josh Reynolds will be the Project Manager and the primary point of contact. Jeff and Josh's contact information is included below for your reference:

Mr. Jeffery Szytel, PE, MS, MBA
Water Systems Consulting, Inc.
Tel: (805) 457-8833, ext. 101
Fax: (805) 888-2764
jszytel@wsc-inc.com

Mr. Josh Reynolds, PE
Water Systems Consulting, Inc.
Tel.: (805) 457-8833, ext. 107
Fax: (805) 888-2764
jreynolds@wsc-inc.com

Mailing Address:
PO Box 4255
San Luis Obispo, CA 93403

Physical Address:
3765 S. Higuera St., Suite 102
San Luis Obispo, CA 93401

"I would highly recommend WSC for any project large or small dealing with water/ wastewater."

–Ben Fine, Public Works Director/City Engineer
City of Pismo Beach

"WSC expertly prepared our Wastewater Master Plan. I have been extremely impressed with their high level of competency and ability to work effectively and interactively with staff. WSC's assessment and modeling of our wastewater collection system has been exemplary. I really enjoy working with staff at WSC; I know I will always get a prompt, insightful and trustworthy response."

–Teresa McClish, Community Development Director
City of Arroyo Grande

"My experience with WSC has shown that the company prides themselves on having a very high work ethic."

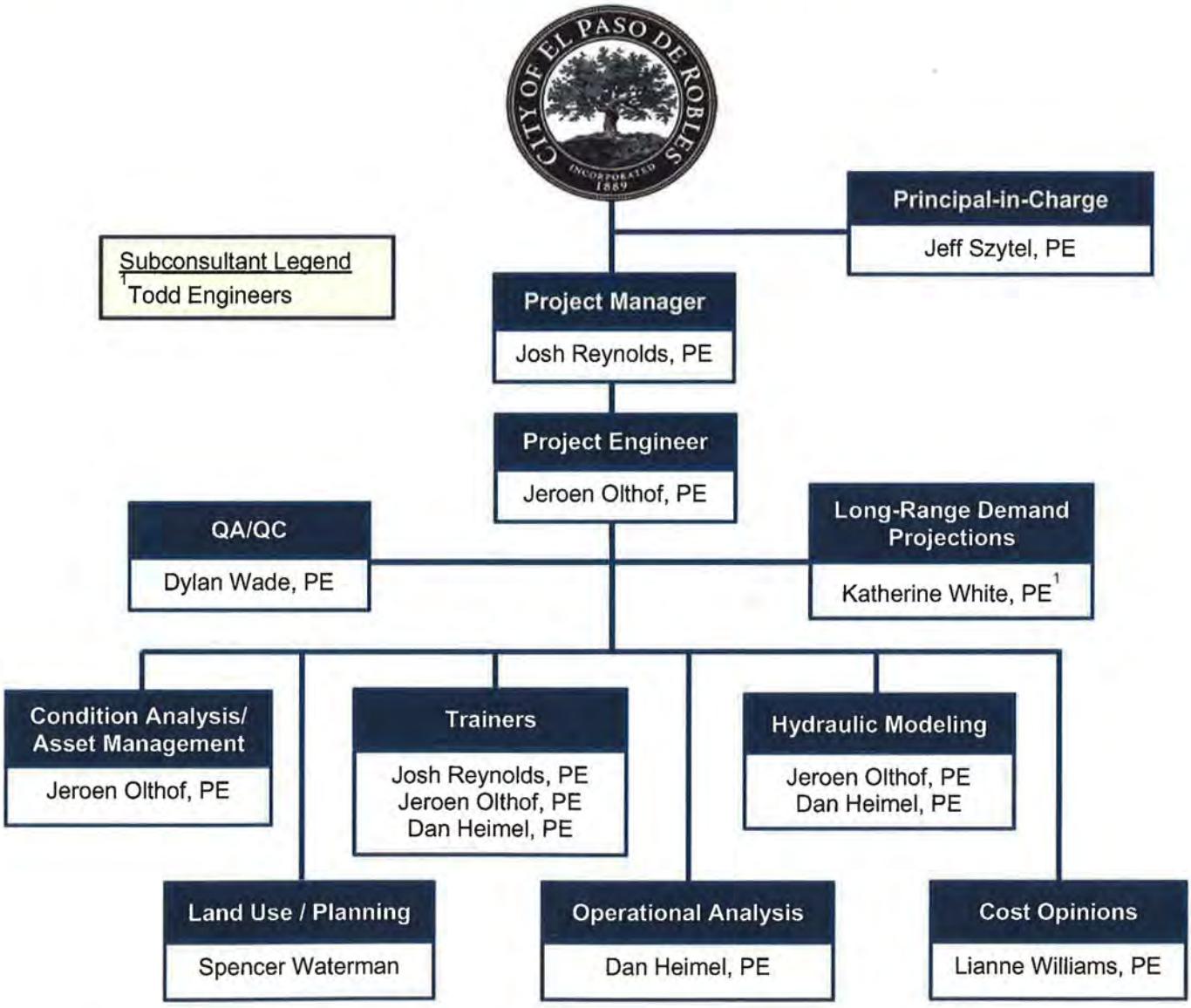
–Shauntele James, Project Manager
California American Water

Project Team

Team Organization

WSC's team is functionally organized to take advantage of the strengths of each of our expert staff, while keeping the structure streamlined to maintain efficiency, quality and accountability. The organization chart shown below summarizes our proposed personnel and organizational structure.

WSC's team provides strong local leadership and a robust understanding of Paso Robles' water system.



WSC Teams With Todd Engineers

Todd Engineers is a consulting firm specializing in groundwater studies, including management, exploration, development, and protection of groundwater resources. Todd Engineers provides the breadth of experience needed for integrated groundwater development and management, while providing specialized water resources management services to their clients.

Todd Engineers has provided groundwater support services to the City of Paso Robles for more than 10 years. Their services have included groundwater support for City planning efforts including the Adaptive Integrated Water Resource Plan and development of the City's 2005 and 2010 Urban Water Management Plans (UWMPs). Kate White, Senior Engineer, was a key author of the UWMPs and is currently preparing several Water Supply Assessments for the City. As a result, the WSC team is familiar with the water resources and issues of the City, its land use and water planning, and water management activities.

Katherine White from Todd Engineers' contact information is located below:

Ms. Katherine White, PE, MS
Todd Engineers
Tel: (510) 747-6920
Fax: (510) 747-6921
kwhite@toddengineers.com

Local Team of Experts

The following table outlines the qualifications and credentials of each of our team's key personnel. It also provides some insight into the value each person adds to the City of Paso Robles. Complete resumes are included in Appendix B.

Project Team	Staff Information
 **Joshua Reynolds, PE, QSD/QSP** *Project Manager, Trainer* **Education** B.S., Civil Engineering, Cal Poly SLO M.S., Civil Engineering, Cal Poly SLO (in-process) **Registration** Civil Engineer, California #C625400 QSD/QSP #24224	**Summary of Relevant Qualifications** ➢ Over 13 years of experience in water and wastewater planning on the Central Coast and has served the City of Paso Robles for over 7 years. ➢ Prepared over 17 water and/or wastewater master plans for many Central Coast agencies, including the Cities of Paso Robles, San Luis Obispo, Santa Maria, Santa Barbara, Guadalupe, Pismo Beach, Arroyo Grande, King City and San Miguel CSD. ➢ Expert hydraulic modeler with experience applying multiple major modeling platforms including WaterGEMS/SewerGEMS and InfoWATER/InfoSEWER ➢ Has acted in the roles of City and District Engineer for Heritage Ranch CSD, San Miguel CSD, King City, and Nipomo CSD. **Value to the City** ➢ Strong design and construction management background allows him to foresee issues before they occur and develop practical solutions. ➢ Understands the master planning process and the variety of uses that a CIP has for a City, from setting impact/connection fees, to budget, to rate studies and annual guidance on upcoming work. ➢ Understands the City's water and wastewater system. ➢ Strong familiarity with local issues and regional context.
 **Jeffery Szytel, PE, MS, MBA** *Principal-in-Charge* **Education** M.B.A., UCLA M.S., Civil Engineering, UCLA B.S., Civil Engineering, UC Davis **Registration** Civil Engineer, California #C63004 CDPH Registered T2 Operator #32674	**Summary of Relevant Qualifications** ➢ Over 15 years of experience in the planning, design and construction and optimization of water and wastewater systems. ➢ Authored over 25 water and wastewater planning documents in California and Nevada for agencies ranging in size from 5,000 to more than 500,000 customers, including 15 recent UWMPs, and several Master Plans. ➢ Principal-in-Charge for the City of Paso Robles Airport Sewer Extension, City of Santa Maria's Utility Master Plan Update, and the City of Arroyo Grande's Water and Sewer Master Plan Updates. ➢ Experience on more than 75 water and wastewater projects in CA and NV, including over 25 planning documents, 75 miles of pipelines, 80 million gallons of water storage, 150 mgd of water and wastewater pumping stations and treatment plants up to 100 mgd. **Value to the City** ➢ Results oriented manager with record of delivering complex projects and programs on-schedule and within budget. ➢ Good communicator with strong management skills. ➢ Team builder, facilitator and collaborative manager. ➢ Founder and CEO of WSC means direct accountability to the City. ➢ Strong financial and capital asset planning capability.

Project Team	Staff Information
 **Dylan Wade, PE** *QA/QC* **Education** B.S., Civil Engineering, BYU, Provo, Utah **Registration** Civil Engineer, California #C64044	**Summary of Relevant Qualifications** ➢ Over 14 years of experience in water planning, design, and construction; including extensive utility experience managing and developing water systems. ➢ Project Manager for the San Miguelito Mutual Water Company Water and Wastewater System Capacity Study. ➢ Resident Engineer for several large projects in the County, including the upgrade of the Lopez Water Treatment Plant, the Morro Bay desalination plant brackish reverse osmosis system, and the Los Osos sewer project. ➢ Former WRAC alternate member and North Coast Subcommittee chairperson. **Value to the City** ➢ Proven track record at resolving complicated water issues including nitrate remediation, State Water negotiations, and analyzing blending scenarios. ➢ Highly successful grant management and grant writing experience. ➢ Established relationships with CDPH, State and Regional Water Resources Control Boards, DWR, California Coastal Commission, and other local agencies. ➢ Understanding of entire capital improvement process, from planning and analysis through implementation and operation.
 **Katherine White, PE, MS** *Long-Range Demand Projections* **Education** M.S., Civil Engineering, UC Berkley B.S., Agricultural Engineering, University of Illinois, Urbana **Registration** Civil Engineer, California #C44262	**Summary of Relevant Qualifications** ➢ Over 20 years of experience in projects involving groundwater management, water supply reliability, water resources engineering, water quality and groundwater contamination investigations, water rights, and litigation support. ➢ Project engineer and major author for the 2005 and 2010 UWMP's for the City of Paso Robles. ➢ Project engineer for water supply assessments for the proposed Gateway project for the City. **Value to the City** ➢ Intimate understanding of the current and projected water demands and available water supplies. ➢ Close working relationship with the City staff. ➢ Currently documenting available water supply, current water use, and estimated water use for the Gateway project and other approved and proposed projects. ➢ Highly regarded among clients for her data management and quantitative skills, her attention to detail, and precision.

Project Team	Staff Information
 **Jeroen Olthof, PE, MS** *Condition Assessment / Asset Management, Trainer, Hydraulic Modeling* **Education** M.S. Civil Engineering, University of Washington, Seattle B.S. Civil Engineering, University of Colorado, Boulder **Registration** Civil Engineer, CA #C58597	**Summary of Relevant Qualifications** ➢ Over 18 years of experience in civil engineering planning and design, specializing in hydraulic modeling and master planning. ➢ Completed more than 60 hydraulic modeling projects and more than 25 water and/or sewer master plans. ➢ Lead engineer on multiple large and complex water hydraulic modeling projects including County of Coastal Branch Capacity Assessment, Water Research Foundation, Denver, CO., Southern Nevada Water Authority, Seattle Public Utilities, and the Oregon State Department of Transportation. ➢ Nationally recognized expert in the application, adaptation and use of database, GIS and modeling technology to solve problems related to wastewater collection systems. ➢ Has several published technical papers on hydraulic modeling. **Value to the City** ➢ Nationally recognized expert in hydraulic modeling, condition assessment and distribution system optimization. ➢ Mr. Olthof and Mr. Szytel have been working together successfully for more than 15 years. ➢ Specialist in data management and analysis including statistical evaluations.
 **Daniel Heimel, PE, MS** *Trainer, Operational Analysis, Hydraulic Modeling* **Education** M.S., Civil Engineering, Cal Poly SLO B.S., Environmental Science, CSU Chico **Registrations** Civil Engineer, California #C80762 CDPH Registered D4Operator #28472 CDPH Registered T2Operator #26014	**Summary of Relevant Qualifications** ➢ Over 9 years of experience working in a water quality and water supply capacity for drinking water municipalities throughout California. ➢ Developed hydraulic models of the Lopez, Chorro Valley and Coastal Branch pipelines, and of the water and sewer systems in Arroyo Grande, Santa Maria and San Luis Obispo, and Santa Barbara. ➢ Project Engineer for the Water and Sewer Master Plan Updates for the Cities of Arroyo Grande, San Luis Obispo, Santa Barbara and Santa Maria. ➢ Lead Author of the 2010 UWMP for CAW's Ventura District. **Value to the City** ➢ Extensive experience utilizing GIS to develop solutions for municipal water utilities. ➢ Water quality specialist with strong operations credentials. ➢ Experience in designing programs for water resources. ➢ Strong analytical skills and practical operations background. ➢ Strong data analysis and modeling capabilities and experience. ➢ Designed programs for water resources management and conjunctive use. ➢ Experienced water system hydraulic modeler.

Project Team	Staff Information
 **Lianne Williams, PE, MS** *Cost Opinions* **Education** M.S., Civil Engineering, Stanford University B.S., Mechanical Engineering, Cal Poly SLO **Registrations** Mechanical Engineer, California #M35941	**Summary of Relevant Qualifications** ➢ Over 4 years of experience in energy, alternative energy and mechanical systems. ➢ Performed cost estimating for more than 10 water and/or wastewater planning projects, which included well projects, pipeline projects and water storage tank improvements. ➢ Project Engineer for the Water and Sewer Master Plan Updates for the Cites of Arroyo Grande, San Luis Obispo and Santa Maria. ➢ Worked on condition-based assessment of the City of Arroyo Grande's water and sewer systems. ➢ Project Engineer and Lead Author of Energy Use Studies for California American Water Company's Sacramento and Monterey District. ➢ Developed climate change and energy evaluations for multiple UWMPs. **Value to the City** ➢ Mechanical engineer with an emphasis on energy sand pumping stations ➢ Highly trained expert on the water-energy nexus. ➢ Strong GIS and data analysis skills. ➢ Experience developing capital improvement programs for water and wastewater systems.
 **Spencer Waterman** *Land Use / Planning* **Education** B.S. City and Regional Planning, Cal Poly SLO **Certifications** American Water Works Association, California-Nevada Section, Water Use Efficiency Practitioner Grade 1, Certificate # 1714	**Summary of Relevant Qualifications** ➢ 2013 California Water Plan Update Central Coast Regional Forum Design Team. ➢ Lead Planner providing land use planning, demographic, spatially allocated demand, and population projections for water and sewer master plans for the Cities of San Luis Obispo, Arroyo Grande, and Santa Maria, and San Migeulito Mutual Water Company and Descanso Community Water District. ➢ Lead Author for 8 UWMPs, including the City of Arroyo Grande, the Nipomo Community Services District, and California American Water Company's districts. ➢ Lead Author for West Valley Water District's Recycled Water Master Plan, which included recycled water demand and market analysis, jurisdictional and regulatory considerations analysis, recycled water source conceptual alternatives development, and workshop facilitation. ➢ Lead Author for the Northern Cities Management Area's Local Groundwater Assistance Grant Program Application Package to DWR. **Value to the City** ➢ Contextual understanding of water supply and demand nexus with land use and development, population and demographics, environmental conditions, socioeconomic conditions, and political conditions. ➢ Strong working knowledge of local water planning data and resources. ➢ Experienced GIS user. ➢ Developed per capita demands for SB 7 using GIS and Census data. ➢ Effective at managing and utilizing numerous and varied data sets.

Understanding & Approach

Project Understanding

Currently, the City of Paso Robles (City) serves water to approximately 30,000 residents, along with commercial and industrial customers within the City limits. At buildout, the City's population is projected to reach 44,000 residents. The City's current sources of water include groundwater from the Salinas River Underflow and the Paso Robles Groundwater Basin. However, the City will soon be adding surface water from Lake Nacimiento to its water supply portfolio. The Phase 1 Surface Water Treatment Plant (WTP) will increase the production capacity and the reliability of the City's water system.

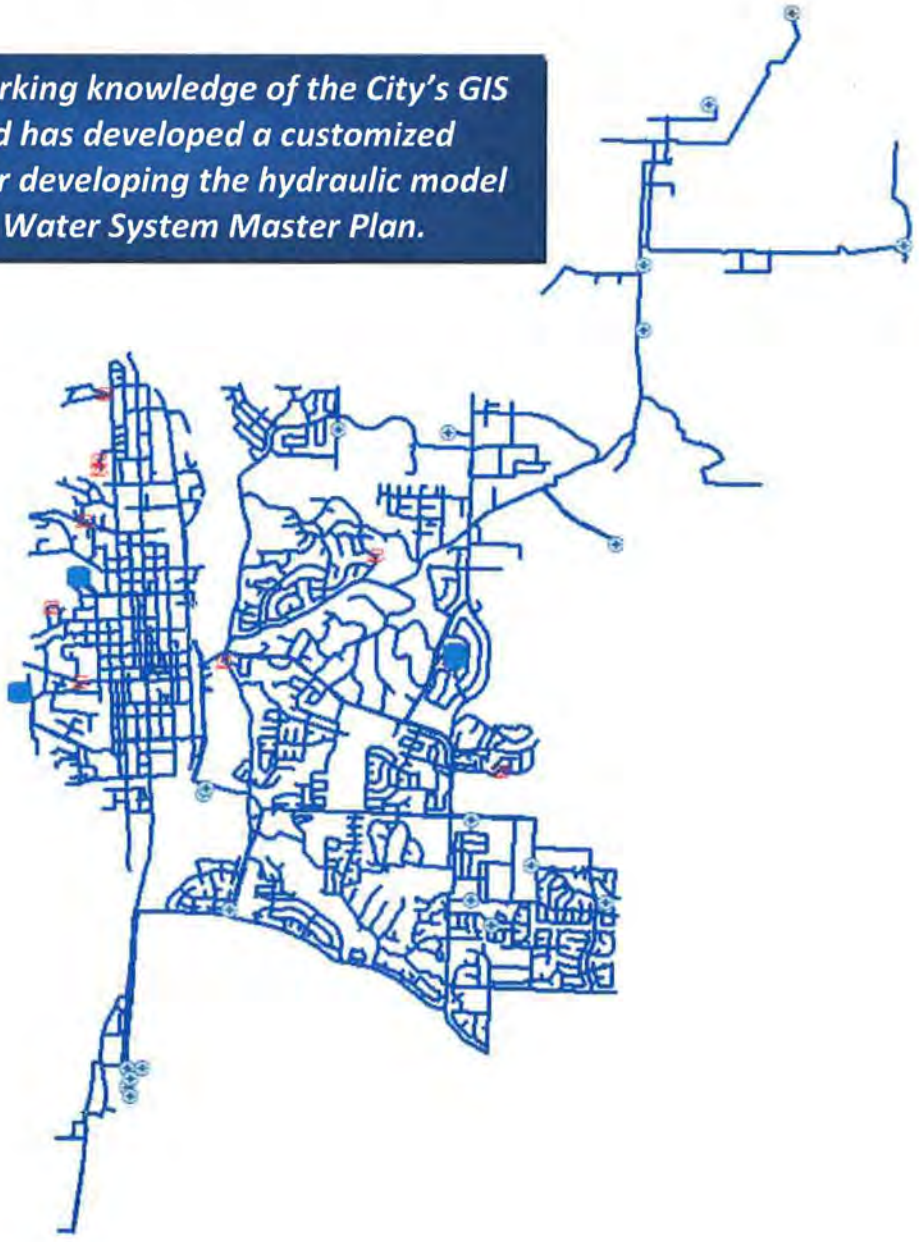
To ensure that the City's water system possesses sufficient capacity to meet the demands of the future population, the City is seeking to update its existing Water System Master Plan. The primary factors driving the need to update the Water System Master Plan include:

- **Capacity Limitations** – A significant portion of the City's anticipated growth is anticipated to occur along the outskirts of the existing distribution system. Conveying water to these new developments will have impacts on the existing distribution network and may require infrastructure upgrades.
- **Aging Infrastructure** – Aging pipelines within the distribution system will need to be replaced or rehabilitated as they reach the end of their useful life. Additionally, a recent failure of a pipeline underneath the railroad tracks highlighted the need for additional pipeline condition analysis of pipes with high consequences of failure.
- **Water Quality** – The addition of surface water into the City's water supply portfolio will increase the potential for elevated levels of disinfection by-products (DBPs) within the distribution system. Additional tool sets and analysis are needed to allow the City to effectively manage treatment costs and DBP levels.
- **Operational Optimization** – The City's water system is split by the Salinas River, with most of the production facilities located on the east side of the distribution system. There is a need to analyze the existing configuration of the distribution system and current operation procedures to determine if modifications could be made to improve water system reliability and efficiency.
- **Budget Planning** - To ensure that sufficient funds are available to cover future infrastructure costs, the City needs to re-evaluate what CIP projects will be required for the distribution system. The cost estimates developed for the City's updated Water System Master Plan will be utilized to help guide future adjustments to the City's water rates.

WSC has developed a tailored approach to address these drivers. Highlights of WSC's proposed approach include:

- Maintaining consistency with other recent water resource and infrastructure planning efforts enhances the credibility and uniformity of the City's planning documents.
- Creating an all-pipes model with spatially allocated demands increases the accuracy and utility of the City's hydraulic model.
- Applying a phased approach to model development enhances the value of the model for operational optimization and infrastructure planning.

WSC has working knowledge of the City's GIS data, and has developed a customized approach for developing the hydraulic model for the Water System Master Plan.



Maintaining Consistency with Other Planning Efforts Enhances the Credibility and Uniformity

WSC understands the need to present consistent estimates of future demands and has developed the following approach to ensure consistency with existing water supply documents.

Coordinated Demand Projections Improve Planning

Developing and maintaining accurate estimates of future water demand is a challenging task, but it is an important component of sound planning. There are numerous factors that impact the water demand that the City may see in the future, including: water supply availability; local demand for growth; and regional/statewide mandates (e.g. SB7x). These factors can then drive land use policy decisions at the local, regional and state level. To ensure consistency with the City's existing water resource planning documents and projection methodologies, WSC has teamed with Todd Engineers. Katherine White has supported the City's water resource planning efforts for the past several years and she is very familiar with the City's current vision for future growth and water demand. Our team's familiarity with the City means that you will not waste your valuable time or resources bringing a consultant up to speed. Instead of spending time researching what the City has already done, we can immediately begin productive collaboration with you to plan the future of the City's water system.

Project Synergies Enhance Value

Managing multiple consultants results in increased demands on City staff time and project cost. WSC is currently working with the City's wastewater division to develop preliminary designs for expanding the sewer collection system in the Airport Area. Our work on this project has enabled us to gain familiarity with land use, geography, demographics, infrastructure, resource considerations and planned developments in this area. The airport area sewer expansion project contains similar scope elements to the Water System Master Plan, including: analysis of spatially allocated water demands; development of land use demand/generation factors; evaluation of future growth impacts on distributed infrastructure; etc. Utilizing one consultant for both of these projects will result in improved efficiency and enhanced quality for the City.

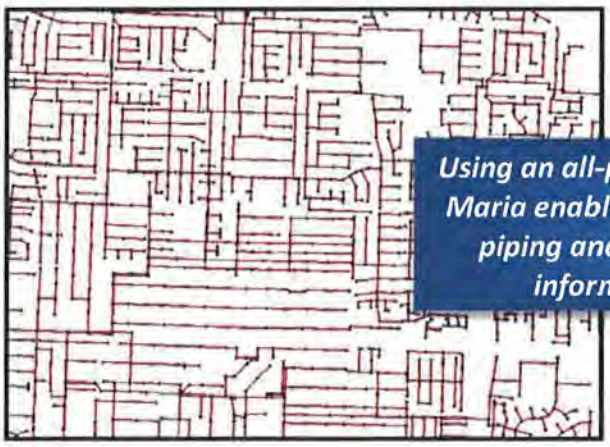
Todd Engineers has worked closely with the City on previous water supply and demand management projects. Todd Engineers' familiarity with the City's demand projection methodologies and supply constraints will limit the need for the City staff to bring the Water System Master Plan consultant up-to-speed on current growth projections.

All-pipes Model with Spatially Allocated Demands Increases the Accuracy and Utility

WSC's recent experience preparing master plans for our water and wastewater clients has revealed the value of spatially allocated all-pipes model.

Direct Parity between the Model and GIS Improves Data Management

One of the primary challenges in maintaining an updated hydraulic model is the need to reflect changes to pipelines and other infrastructure in multiple locations. By developing all-pipes models with a one to one relationship with the City's GIS, updates can be made in GIS geodatabase and imported into the water model or vice versa. This improves the consistency, increases updating efficiency and provides better access to the latest information on the City's distribution system.

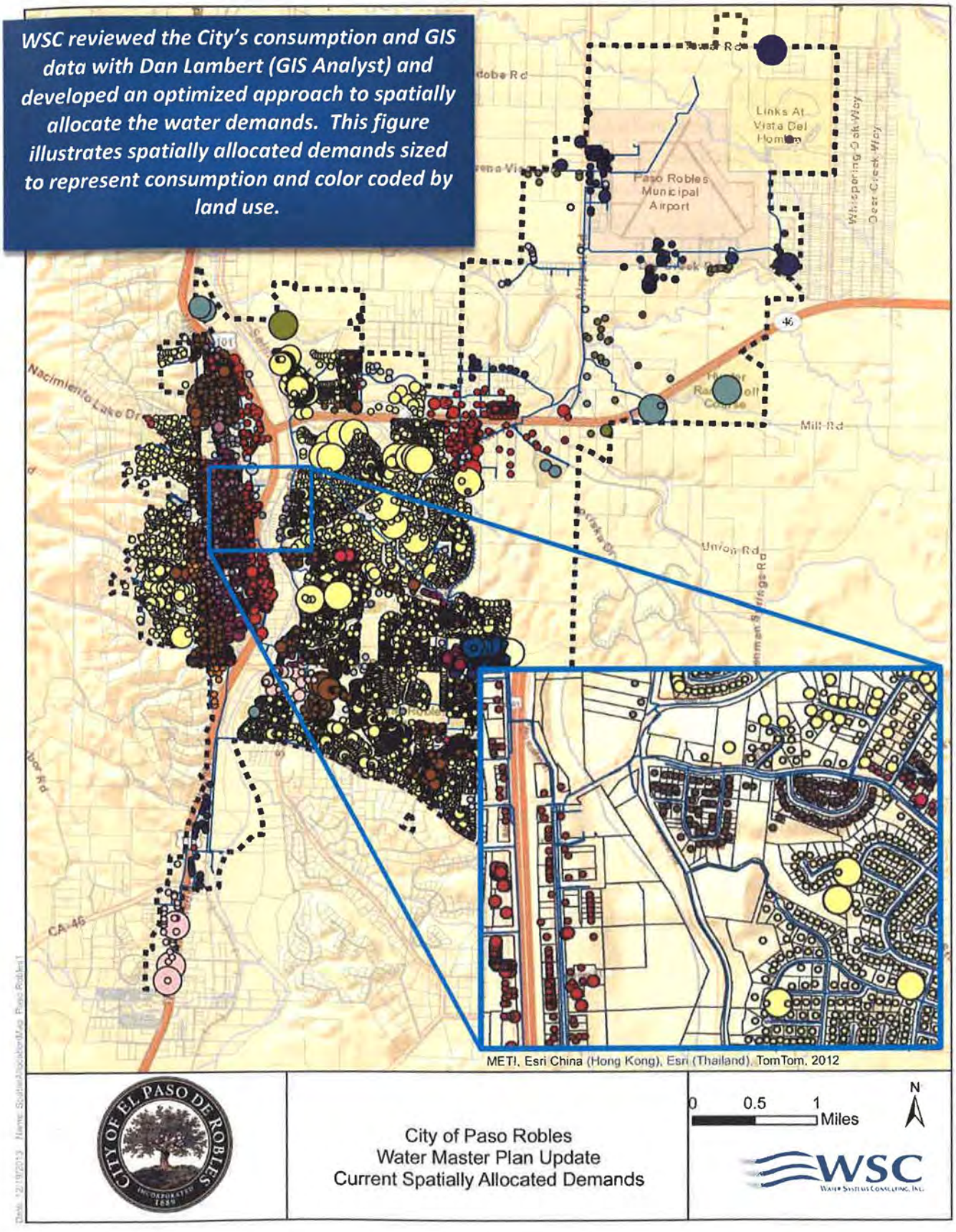


Using an all-pipes model for the City of Santa Maria enabled WSC to easily update system piping and attribute data as additional information became available.

Spatially Allocated Demands Improve Accuracy

The City's current model appears to be loaded using spatially allocated demands. However, due to recent economic and conservation trends, that loading may not be representative of existing demands. WSC proposes to link recent customer billing data to parcel data to develop updated spatially allocated demands. Once established, this link can be used to quickly update the model loading as demand patterns change.

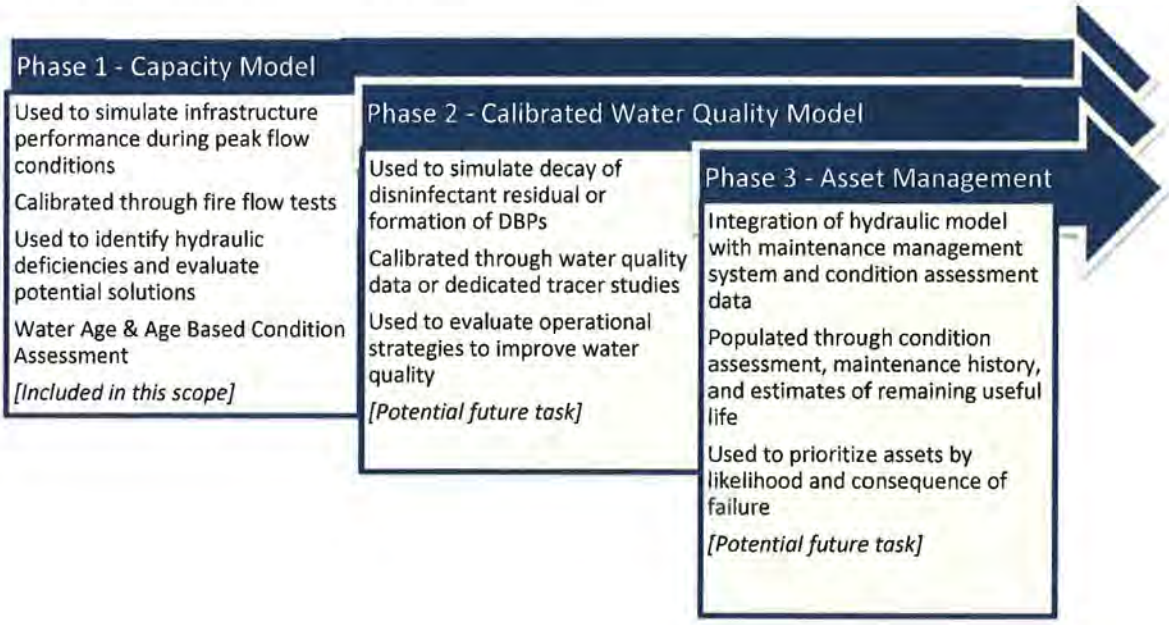
In addition to providing accurate demand allocation for the model, the spatially allocated demands allow for the development of land use demand factors (the demand associated with a unit area for each land use type in the City). These factors can be invaluable for spatially allocating future demands for proposed development areas or urban densification. Spatially allocated water demands are also a valuable tool for developing loading estimates for the wastewater model and can become the basis for developing spatially allocated wastewater generation estimates.


WSC reviewed the City's consumption and GIS data with Dan Lambert (GIS Analyst) and developed an optimized approach to spatially allocate the water demands. This figure illustrates spatially allocated demands sized to represent consumption and color coded by land use.
Links At Vista Del Homble
Paso Robles Municipal Airport
Mill Rd
Union Rd
CA-46
Nacimiento Lake Dr
Whispering Oak Way
Deer Creek Way
METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012
City of Paso Robles
Water Master Plan Update
Current Spatially Allocated Demands
0 0.5 1 Miles
N
WSC
Water Systems Consulting, Inc.

Applying a Phased Approach Enhances the Value of the Model

WSC understands that the City's near term goal is to update its CIP for the purposes of budgeting and preparing new water rates. However, the updated model will be an important tool that the City wants to utilize for future operational and planning projects. To meet the City's short term needs, but also provide the City with tools that it can build upon, WSC proposes a phased approach to model development for the Water System Master Plan. This approach will allow the City to meet its near-term goals under the current project, while providing the foundation for future enhancement of the model for improved operations and planning.

Model Development – a Phased Approach



Phase 1 – Capacity Model

Included in the scope of work for this proposal is a capacity model that will allow the City to analyze current and future capacity deficiencies. Phase 1 also includes EPS scenarios to investigate water age and an age-based condition assessment that will identify the remaining useful life for the City's key assets. Additionally, this scope of work includes is a small budget for operational analysis. For this task, WSC will work with the City to identify the highest priority needs and develop a scope of work that fits within the available budget. Depending on the City's priorities, this scope could be utilized to analyze opportunities to improve emergency response planning; operational optimization; energy optimization or other high priority issues.

Emergency Planning Improves Response

As infrastructure ages and its remaining useful life decreases, probability of failure increases. Pipeline failures force a utility into a reactive mode, which may reduce the level of service provided by the City. A hydraulic model can help a utility prepare for potential pipeline failures by identifying which pipelines have high utilization and are critical to system operations and which pipelines have redundancy and are a lower priority for repair in an emergency. This will allow City staff to react more effectively to pipeline failures when they do occur.

Operational Optimization Increases Reliability

A hydraulic model can be utilized to optimize distribution system operations or recommend capital improvements to improve the reliability of a distribution system. The City's distribution system is separated into two subareas by Highway 101, the rail road and the Salinas River. Given that the majority of the City's supply is located in the southern and eastern sections of the distribution system, it is important that there is sufficient operational flexibility within the distribution system to allow the City to reliably deliver water to all of its customers.

For the City, WSC recently analyzed the impact of a main break under a railroad crossing and identified several alternative operational scenarios to maintain water service to the affected area.

Energy Optimization Reduces Operating Costs

Hydraulic modeling of pump stations can identify potential energy cost savings that a utility can utilize to reduce O&M costs. Analysis of pump and system curves can identify inefficient booster pumps that can be replaced with more efficient equipment. Analysis of storage tank and booster pump set points can be used to identify alternative operational strategies to reduce energy use.

Through hydraulic modeling and pump station analysis, WSC identified cost-effective solutions for the City of San Luis Obispo's recycled water pump station. WSC helped the City implement these solutions, which resulted in energy savings and significant operational improvements.

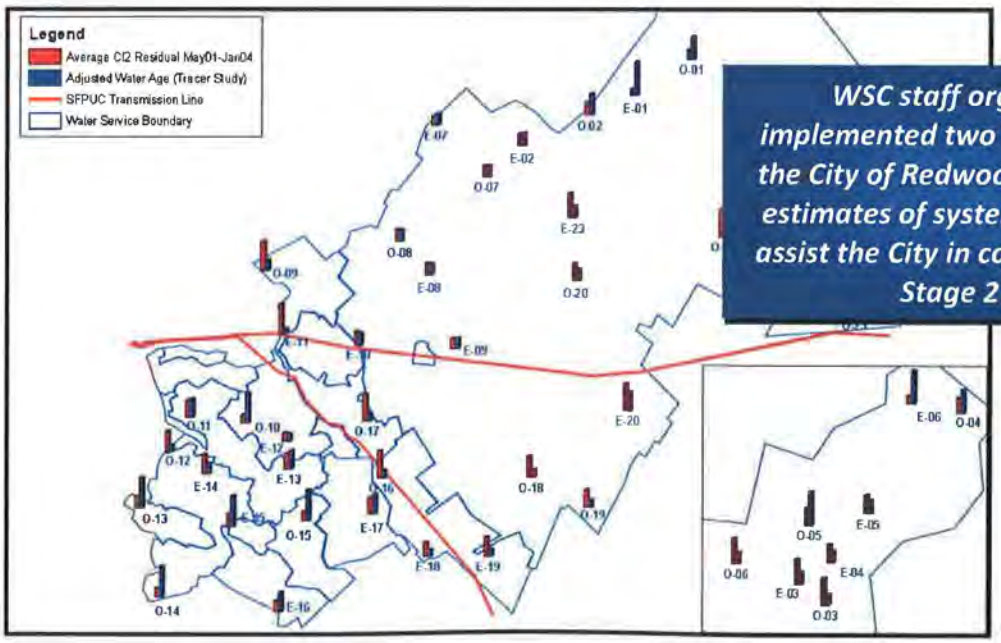
Phase 2- Calibrated Water Quality Model

A potential second phase for the City's water model includes the development of a calibrated water quality model. Utilizing water quality data available from the City's distribution system monitoring or from dedicated tracer studies, WSC would update the City's hydraulic model to include a water quality component. The water quality model could be utilized to analyze Cl2 residuals, DBP formation, Chromium VI concentrations and other water quality constituents within the distribution system. Additionally, the water quality model could be used to evaluate alternative blending scenarios.

Water Quality Modeling Improves Public Safety

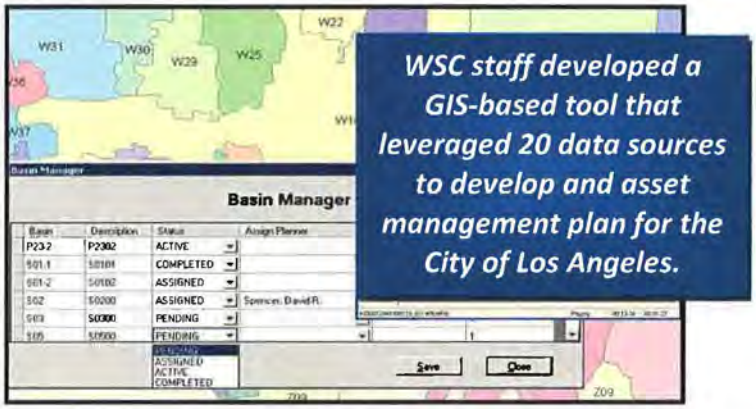
Managing disinfection by-products (DBPs) from chlorination is essential to ensure that water delivered through the City's distribution system does not exceed the California Department of Public Health's Maximum Contaminant Levels. Developing a water quality component for the water model will allow the City to plan for and manage the increased DBP levels within the distribution system caused by the inclusion of surface water from the Nacimiento Water Project. A fully calibrated extended period simulation (EPS) water quality model could be a valuable tool for the City to estimate DBP concentrations in the distribution system and optimizing the use of the City's carbon treatment systems to reduce operating costs.

The City currently utilizes free chlorine as its primary and secondary disinfectant. Due to the reactive nature of free chlorine, it is not as stable as chloramines and tends to break down more rapidly as water age increases. The decay characteristics of free chlorine make it an excellent constituent for calibrating a water quality model. Free chlorine residual data can be used as a surrogate for water age and/or DBP concentration within the distribution system and can also be used to calibrate the water quality model to observed conditions within the distribution system.



Phase 3 – Asset Management Model

A hydraulic model can be a key component of any asset management program. Maintaining a relationship between the distribution system model and the GIS dataset allows a utility to incorporate hydraulic parameters into its asset management algorithms. In recent years several software packages (CapPlan; InfoMaster; IO) have been developed that allow utilities to integrate asset management into their hydraulic model or GIS software packages. These asset management modules allow users to perform risk based assessments on every pipeline in the distribution system and identify the assets that have highest risk (the combination of probability of failure and consequence of failure). Utilizing these risk rankings, multiple scenarios can be run to develop an optimized CIP that addresses the highest-risk assets first. The implementation of these tools can be evaluated as part of a potential future task.



Local Firm is Responsive and Accessible

WSC is the premier water and wastewater consulting firm on the Central Coast. We combine industry leading capability with personalized, local service. Working with a responsive, local firm eases coordination throughout the project and leads to enhanced collaboration. We are available for impromptu meetings to discuss specific topics and/or review field conditions to gain greater insight into the City's needs. We are responsive and accessible to provide the training and modeling support that the City is looking for as a part of this Water System Master Plan contract.

Work Program

1- PROJECT MANAGEMENT

1.1 Kick-Off Meeting

- Plan, organize and conduct one kickoff meeting. The purpose of the Kickoff Meeting will be to:

  (1) Establish roles and responsibilities

  (2) Review scope, schedule and deliverables

  (3) Review available data and establish data needs

  (4) Review master plan update requirements and methodology

  (5) Discuss agency coordination.

Deliverable: A draft agenda, a data request log, a work plan for the project, a project contact list, and a project schedule with milestones provided to the City at least two days before the meeting. A list of action items and assignments will be provided within one week following the meeting.

1.2 Project Meetings

- Conduct six (6) periodic hour 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 Master Plan. Whenever possible, meetings will be combined to increase project efficiency.

  (1) Data Review and Demand Allocation Meeting

  (2) Draft Evaluation Criteria and Demand Allocation TM & Model Development and Calibration TM Review Meeting

  (3) Operational Analysis Review Meeting

  (4) Preliminary Capacity Analysis Results Meeting

  (5) Draft Project Description Sheets Review Meeting

  (6) Draft Water Master Plan Review Meeting

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

1.3 Status Update Conference Calls

- Conduct bi-weekly conference calls with the City's project manager.

1.4 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: A rolling four (4) week schedule and an action item/key decision log.

1.5 QA/QC

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

2- DATA COLLECTION AND REVIEW OF WATER SYSTEM OPERATIONAL DATA

2.1 Data Request

- Prepare a data request log to track data sets requested from the City. The data request will include the existing Water Master Plan and City maps and records for the water system. It will also include GIS data sets, operational data, and operational strategies used by City staff in controlling the system.
- Maintain the data request log as items are provided by the City or new items are identified.

Deliverable: An updated data request log.

2.2 Data Review

- Review existing data to evaluate its use for development of a new hydraulic model. Identify any missing data that needs to be generated to support the hydraulic model development. Work with City staff to develop a plan for population of any missing data.

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

2.3 System Evaluation Criteria

- Review previously used criteria for design and system evaluation. Develop a recommended set of criteria for use in this project. Criteria are expected to include minimum and maximum pressures, maximum velocities, and required fire flows. Develop demand peaking factors (maximum day, peak hour, and minimum day) using data provided by the City.

2.4 Spatial Demand Allocation

- Compile historical water use data and link the data to a geographic location for each account, either through meter locations, parcel numbers, or street addresses. Calculate average demands for each demand point in preparation for allocating demands to the hydraulic model. Overlay the spatially-allocated demand with land use information in GIS. Use the observed demands to calculate per-acre land use duty factors to be used when estimating future demands.

2.5 Future Demand Projection

- Compile growth projection documents including the City's Urban Water Management Plan, General Plan Land Use Element, and information about planned annexations. Prepare estimates of future demands at horizons of 5 years, 10 years, and buildout (estimated to be 30 years).

2.6 Evaluation Criteria and Demand Allocation TM

- Develop a draft technical memorandum to document the evaluation criteria, the spatial demand allocation, and the future demand projection. Incorporate City review comments into a final technical memorandum.

Deliverable: Draft and final technical memorandum in electronic PDF format.

3- HYDRAULIC MODEL DEVELOPMENT

3.1 Model Creation

- Develop a WaterCAD-compatible hydraulic model of the City's distribution system. Import the City's GIS infrastructure database into the hydraulic modeling software. Review network connectivity and notify City of any discrepancies or unexplained connections. Add control valves, zone boundary valves, storage tanks, wells, and pumps to the model and populate attributes using data provided by the City.

3.2 Model Calibration

- Calibrate the hydraulic model to observed conditions during steady-state conditions. Use results of historic fire flow tests performed by the City to adjust pipe roughness factors or minor losses to achieve acceptable agreement between model results and observed test results.

3.3 Model Development and Calibration TM

- Document the process of model development and calibration in a draft technical memorandum. Incorporate City review comments into a final technical memorandum.

Deliverables: Draft and final technical memorandum in electronic PDF format.

4- SYSTEM CAPACITY ANALYSIS

4.1 Existing System Deficiencies

- Perform steady-state analyses of the existing distribution system to identify hydraulic deficiencies. Runs are expected to include average day demand, maximum day demand, peak hour demand, and maximum day demand plus fire flow. Areas where the existing system does not meet the evaluation criteria will be documented as deficiencies.

4.2 Future System Deficiencies

- Using previous planning documents, information provided by the City, and engineering judgment, add future system expansions to the future conditions model. Include major transmission, storage, production, and pumping facilities to serve currently undeveloped areas. Assign future demands to future areas using land use-based demand factors or more specific information if available. Perform steady-state analyses of the future distribution system. Planning horizons are expected to include 5-year, 10-year, and buildout (assumed to be 30 years). System expansions (e.g., future transmission pipelines in undeveloped areas) will be sized to meet the evaluation criteria at buildout. Areas where the existing system does not meet the evaluation criteria with future demands will be documented as deficiencies.

Deliverable: Working maps showing existing and future system deficiencies.

5- OPERATIONAL ANALYSIS

5.1 Extended Period Simulation

- Develop an extended period simulation (EPS) model of the existing distribution system. Develop diurnal patterns to show variation of demand over a typical 24-hour period. Load model with diurnal patterns. Add control strategies to wells and pump stations based on information from City staff. Run the model and compare observed tank levels to model results.

5.2 Water Age Analysis

- Modeling of individual water quality constituents (e.g., disinfectant residual) is not included in this scope. However, water age can be used as an approximate indicator of potential areas for water quality concern. Use the EPS model to simulate water age throughout the distribution system during summer and winter conditions. Hold a meeting with City staff to review water age results and compare to staff operational knowledge of problem areas.

5.3 System Reliability Analysis

- Use the EPS model of the existing system to evaluate potential operational changes or system modifications. Work with City staff to identify areas of concern (e.g., energy used for pumping, areas of the system without redundancy in supply, taste and odor complaints, anticipated new water quality regulations, or formation of disinfection by products (DBPs)). This scope includes an allowance of hours for modeling the highest-priority issues. Additional modeling work to further evaluate areas in more detail may be performed under a separate agreement.

6- CAPITAL IMPROVEMENT PLAN

6.1 Preliminary Project List

- Develop a preliminary list of projects to address deficiencies identified during system analysis. Develop estimated construction costs for improvement projects. Prioritize improvements based on what planning horizon they are needed for (existing, 5-year, 10-year, and buildout).

6.2 Condition-Based Improvement Planning

- Review available information about system age and condition of distribution system assets. Develop a preliminary replacement schedule based on industry practices. Develop a preliminary estimate of required funding for rehabilitation and replacement of aging infrastructure.

6.3 Project Description Sheets

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

Deliverables: Draft and revised project list. Project description sheets for recommended projects.

7- REPORT PREPARATION, PRESENTATIONS, AND TRAINING

7.1 Water Master Plan Preparation

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

7.2 Presentations

- Prepare two presentations about the Water Master Plan Update and deliver them at public workshops or at City Council meetings. Incorporate feedback received into the final Water Master Plan.

7.3 Hydraulic Model Training

- Provide electronic files for final hydraulic model to City staff. Provide training in use of model for development analysis, fire flow analysis, or other needs identified by the City.

Deliverables: Six paper copies and an electronic PDF copy of the draft Water Master Plan. Eight spiral-bound copies and an electronic PDF copy of the final Water Master Plan. Electronic files for the final hydraulic model in WaterCAD-compatible format.

ASSUMPTIONS

- The City's GIS mapping represents the current configuration of the distribution system and additional mapping updates will not be required.
- The City will provide a water consumption dataset that can be linked to the City's parcel GIS dataset.
- The City possesses sufficient flow and pressure data from previous hydrants tests to calibrate the model. Preparing and implementing a hydrant flow testing plan would need to be performed under a separate agreement and would impact the provided schedule.