Proposal for

Master Plan and Condition Assessment Study

Project No. 2122-012

September 23, 2021

TRABUCO CANYON WATER DISTRICT

WOODARD & CURRAN

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WOODARD &CURRAN

September 23, 2021

Ms. Lorrie Lausten, PE
District Engineer
Trabuco Canyon Water District
Administration Office
32003 Dove Canyon Dr.
Trabuco Canyon, CA 92679

Re: Proposal for Master Plan and Condition Assessment Study (Project No. 2122-012)

Dear Ms. Lausten:

Woodard & Curran appreciates the opportunity to work cooperatively with the Trabuco Canyon Water District (District) on the Master Plan and Condition Assessment Study. Woodard & Curran's team experience, coupled with our local knowledge of the District, provide exceptional qualifications to accomplish this plan.

Our project approach and work plan reflect our team members' extensive experience in preparing flow monitoring, model development, condition assessment and master planning projects throughout California for 40 years. Our technical approach focuses on three key areas:

- A project management approach with an emphasis on **clear and frequent communication** using **local Orange County staff;**
- **Maximizing efficiency and value** to accomplish the work within budget**;**
- Understanding data quality to provide **sound model calibration** with an eye to the future.

The project will be managed and staffed from Woodard & Curran's office in Laguna Hills. Janet Fordunski will serve as Project Manager with Scott Goldman as Principal-in-Charge. Please contact us if you have any questions about our proposal or need any additional information. Our mailing address is shown on this letterhead and our email addresses and telephone numbers are listed below.

This proposal shall remain valid for a period of not less than 90 calendar days from the date of submittal.

Sincerely,

WOODARD & CURRAN

Kathleen Higgins

Kathleen Higgins, P.E.
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Section 1

Executive Summary

Master Plan and Condition Assessment Study Project No. 2122-012

Section One

EXECUTIVE SUMMARY

A Water Facilities Master Plan is a road map for implementing infrastructure improvement projects to meet present and future needs over a planning horizon. Master Plans identify a capital improvement plan (CIP) and a method to generate revenue to finance them. Basically, the Plan identifies what to do, when to do it, and how to pay for it. Updating the Master Plan is necessary for the document to evolve as demands on the system and the condition of the facilities change over time.

The Trabuco Canyon Water District wishes to update their 1999 Water, Wastewater and Reclaimed Water Master Plan. The District is facing challenges from aging infrastructure, more concentrated and corrosive sewer flows due to conservation, increased energy and water supply costs, and changing regulatory requirements. The approach to updating the Master Plan will be to analyze current conditions, project future requirements, identify projects that address capacity and mitigate risk of failure, develop a CIP, and perform a financial analysis. The main constraints to developing this Master Plan are the budget and schedule.

Woodard & Curran will accomplish the comprehensive Water Facilities Master Plan Update within the budget and schedule using an approach that maximizes efficiency and value. Efficiencies will be achieved in the field work portion of the study by utilizing local Orange County staff for site visits, condition assessments, and sewer flow monitoring. Woodard & Curran's proposed team of in-person local experts are familiar with District staff from working together on the 2020 Trabuco Canyon Water District Municipal Well Feasibility Study. Key local Orange County staff from Woodard & Curran include **Scott Goldman, Jennifer Ziv, Janet Fordunski, and Justin Kraetsch.** Orange County local staff will be supported by our national modeling team for updating the existing water and non-domestic water models and developing a new sewer model. By providing a balance of local face-to-face staff and remote analytical staff, the work can be accomplished within budget and schedule while maintaining highest quality.

Sewer flow monitoring and facility condition assessments will be performed by V&A, a subconsultant based in San Diego. Sewer flow monitoring will provide data needed for model calibration. Flows will be monitored at sewer lift stations using data loggers and/or other methods depending on the pump. Flow within the collection system will be monitored by installing flow meters at five locations for a duration of 8 weeks at strategic locations. The condition assessment work will be approached to provide the most value in an efficient manner. The transmission main condition assessment will be provided by V&A in a phased approach. The first phase will be a non-destructive soil corrosivity investigation, which can be performed with the transmission main in service and does not require direct access to the pipeline. A combination of soil resistivity testing and cell-to-cell surveys along the alignment will assess the likelihood of active corrosion occurring on mortar-coated pipe materials. The corrosivity investigation will identify potential areas of corrosion where more focused condition assessment will be recommended as part of the Master Plan.

Budget efficiencies are also facilitated by listing services "menu style" where the District can pick and choose the level of effort. In this manner the District can choose to evaluate facilities with higher need and defer the cost of evaluating other facilities that are in better condition. Menu-style optional tasks include pump station condition assessments and optional CCTV inspection and surveying manhole inverts.

The Master Plan will be built on conclusions of each of the tasks. The approach to compiling the master plan is to issue draft technical memos for the tasks and ask for review by the District. The final TM will be turned into a section of the Master Plan document.

Section 2

Scope

SCOPE

SCOPE OF SERVICES

The scope of services for the Master Plan and Condition Assessment Study have been numbered according to the RFP. Technical Memos (TMs) will be provided as identified in the Scope under each Task. TMs will be used as the basis for the Chapters in the Master Plan and District comments on the TMs will be incorporated.

Task 1 – Data Gathering and Review

Under this task, the Woodard & Curran team will review existing information related to the water, wastewater, and non-domestic water systems include relevant reports, planning documents, maps, facility information, and other required data. The data that will be requested from the District includes :

- 1999 Master Plan and other available planning documents, such as General Plan, Specific Plans, including proposed or planned development or redevelopment with land use type and number of dwelling units;
- Water supply agreements and contracts
- Hydraulic schematics of the domestic water, non-domestic water and sewer systems
- Water, wastewater, non-domestic water maps, and GIS files
- Existing hydraulic models for water and non-domestic water
- Record drawings for water, wastewater, and non-domestic water facilities
- Water and wastewater pump station as-built drawings and operating information (pump models, type, and capacities; pump curves, on and off operating levels)
- Water, sewer and non-domestic water billing data;
- Available rainfall data
- Water and wastewater treatment plant SCADA data, and water and wastewater pump station SCADA data
- Available hydrant testing data to assess its adequacy for calibration
- Latest County parcel GIS files and database (e.g., tax assessors' database containing APN, address, use code, dwelling units, and building square footage)
- Maintenance records, including data relating to maintenance hot spots, previous blockages and sanitary sewer overflows, and known problem areas.

<u>Task 1 Deliverables</u>

- Data Request.
- Task 1 Kickoff Meeting (virtual), including agenda, PowerPoint slides, and notes.

<u>Task 1 Assumptions</u>

- Woodard & Curran can rely on the information provided by the District to serve as a basis for the work
- Sewer invert elevations on the west side will be provided by the District in GIS format by the time of the study or the District will authorize an optional surveying task to collect the invert elevations.
- District will request parcel data from the County of Orange.

Task 2 - Water Source Evaluation

- Woodard & Curran will review available information of the existing water sources to analyze their adequacy and reliability including identifying water quality issues, legal/institutional/contractual constraints, environmental documentation issues, and system issues as well as cost consideration.

<u>Task 2 Deliverables</u>

- Water Source Evaluation TM, draft, in electronic format.
- Task 2 Meeting (virtual) to discuss evaluation results, including agenda, PowerPoint slides, and notes.

Task 2 Assumptions

- Woodard & Curran will rely on the information provided by the District to serve as a basis for the work.

Task 3 – Hydraulic Model Software Updates

Woodard & Curran will:

- Review the existing models for domestic and non-domestic systems.
- Recommend a GIS-based hydraulic modeling application to update modeling and design tools for domestic water, non-domestic water and sewer systems.
- Procure quotes for up to three vendors for an in-house license and up to a five-year support contract.
- Coordinate demonstrations and provide a technical memorandum to the District.

Task 3 Deliverables

- Recommendations for modeling applications for water, non-domestic water and sewer will be presented verbally at the Task 4 meeting .

Task 3 Assumptions

- Operational domestic and non-domestic models using InfoWater by Innovyze will be provided by the District
- Woodard & Curran will use its own software licenses to view the existing models

Task 4 – Update, Calibrate, and Validate Existing Water and Non-domestic Hydraulic Models

Under this task, Woodard & Curran will develop a field data collection plan for additional hydrant testing, including forms for District staff to use to record data. Fire flow locations will be selected to provide representative data accounting for geography, pipe material, and pipe age. Woodard & Curran will schedule a meeting with District staff to discuss the hydrant testing plan with District operations staff.

Woodard & Curran will update the water and non-domestic models and perform model calibration using the software recommended in Task 3. The hydraulic models will be updated using the District's latest GIS data and the information collected in Task 1 and/or available elevation data to develop a ground model for modeling junctions. The modeled water distribution network will include active water transmission and distribution system pipelines 6-inches in diameter and larger, The finished models will represent each system including supply sources, pump stations, PRVs, tanks, and pressure zones. Laterals will only be included when needed for specific analyses.

Task 4 Deliverables

- Hydrant Testing Plan, electronic format.
- Screen shots of updated water and non-domestic water system models.

Task 4 Assumptions

- Woodard & Curran will use its own software licenses for the work.
- District will purchase their own software licenses if they wish to use the model after the Master Plan has been completed.
- Up to ten (10) fire flow testing locations (or as reasonable given District staff availability), with data collection forms.
- Assumes two (2) days of hydrant tests to be performed in the field by District staff and observed by Woodard & Curran staff.

Task 5 –Water and Non-Domestic Water Systems – Existing and Future Demand Allocation and Analysis

Using the models developed in Task 4, Woodard & Curran will evaluate the existing and future water and non-domestic water systems for existing and future demands.

Subtask 5.1 – Existing Demands

Woodard & Curran will review customer billing and water use data and existing parcel data (including land use type, number and type of dwelling units, etc.) to determine an approach for using this data to estimate existing average water demands. The methodology to be used to develop model loadings will depend on the format and completeness of available parcel-based data. This task also includes developing unit demand/flow factors to be used for estimating future demand/flow projections.

Subtask 5.2 – Future Projections

This task includes developing projections of future development within the District based on data provided for proposed or planned development or redevelopment projects to be included in the Master Plan. Woodard & Curran will use this planning data to develop estimates of future water demands. Woodard & Curran will consider the impact of conservation when developing the future demand estimates. Unless specified by the District, no future non-domestic customers will be identified.

An evaluation of both fire flow and duration criteria for various land use categories based on input provided by the District will be performed using industry standards.

Subtask 5.3 – Scenario Development and Hydraulic Network Analysis

For both models, Woodard & Curran will develop up to three network scenarios, including a scenario to represent the existing system configuration and up to three (3) different operating scenarios (which may include scenarios representing emergency supply conditions) to model existing and future conditions with a suite of up to four demand scenarios such as Average Winter (EPS, which could be used for water quality evaluations), Average Summer (EPS), Maximum Day (EPS, which will include Peak Hour), and Maximum Day + Fire Flow.

Woodard & Curran will use the models to evaluate the performance of the water and non-domestic distribution systems under the various network and demand scenarios and identify system deficiencies and potential improvements. Existing operations will be used as the basis for identifying deficiencies. Performance criteria used to perform the analyses will be developed in Task 13 and discussed with the District.

Subtask 5.4 – Water and Non-domestic Water Systems Modeling and Analysis Technical Memorandum

This task includes development of draft technical memorandums summarizing the model development approach, the analysis criteria used, the findings of the analysis, and model documentation.

Task 5 Deliverables

- Land use database with existing and future consumption projections.
- Water and Non-domestic Water Systems Modeling and Analysis TM, draft, in electronic format.
- Task 5 Meeting (virtual) including agenda, PowerPoint slides, and notes.

Task 6 – Wastewater Collection System Hydraulic Model Development

Under this task, Woodard & Curran will develop a new hydraulic model of the wastewater collection system using the recommended modeling software from Task 3 and assess system capacity under existing and future conditions as well as identify potential improvements. Woodard & Curran will use its own software licenses for the work.

Subtask 6.1 – Existing Model Loads

Woodard & Curran will review lift station data, Wastewater Treatment Plant data, customer billing, water use data and existing parcel data (including land use type, number and type of dwelling units, etc.) to determine an approach for using this data to estimate existing average sewer base wastewater flows. The methodology to be used to develop model loadings will depend on the format and completeness of available parcel-based data.

Subtask 6.2 – Future Load Projections

This task includes developing projections of future development within the District based on data provided for proposed or planned development or redevelopment projects to be included in the Master Plan. Ideally, development would be specified by assessor parcel number (APN), lot size, number and type of dwelling units, and building square footage and type of non-residential land uses, as well as the projected timing of development. Woodard & Curran will use this planning data to develop estimates of future wastewater flows for 2030, 2035 and 2045. Woodard & Curran will consider the impact of conservation when estimating future load projections.

Subtask 6.3 – Develop Model Network

Woodard & Curran will develop the wastewater hydraulic model to include the District's entire trunk sewer system, including sewers and force mains, based on GIS data provided by the District under Task 1 and/or available elevation data to develop a ground model for modeling manhole junctions. The modeled sewer network will include most sewers 8-inches in diameter and larger, eight (8) District-owned pump stations and downstream forecemains.

This task includes allocating the existing and future loads developed in Subtasks 6.1 and 6.2 to the modeled sewer mains. This task also includes developing and refining the operating rules and pump station capacity that will be used to evaluate the eight (8) District-owned pump stations to be included in the hydraulic model. The budget for this task assumes that elevation data provided by the District will be in a consistent datum and minimal corrections will be required.

Subtask 6.4 – Model Calibration

Woodard & Curran will run the model under existing conditions and compare the computed dry weather flow hydrographs to the observed flow monitoring data from Task 8 and SCADA data provided under Task 1. Modeling parameters such as unit flow rates and diurnal curves will be adjusted as needed to achieve a reasonable match for modeled to metered flows. For larger pump stations where sufficient SCADA data is available, pump station inflows will be reconstructed based on pump runtime and wet well level data. Calibration will be performed for the temporary flow meters, as well as for flow data from any pump stations where data is available.

Subtask 6.5 – Wastewater Systems Modeling and Analysis Technical Memorandum

Woodard & Curran will develop a draft technical memorandum (TM) summarizing the basis of existing and future modeled sewer flows.

<u>Task 6 Deliverables</u>

- Land use database with existing and future discharge projections.
- Wastewater Collection System Hydraulic Modeling and Analysis TM, draft, in electronic format.
- Task 6 Meeting (virtual) including agenda, PowerPoint slides, and notes.

<u>Task 6 Assumptions</u>

- 195,000 LF of sewer pipelines, 47,000 LF of sewer force mains, 812 sewer manholes, and 8 lift stations.
- Up to two (2) 4-hour site visits with District staff to confirm critical as-built info.
- District will provide a substantially complete sewer geodatabase with manhole locations and pipe diameters.
- Calibration will be performed at up to 10 locations, including the 5 temporary flow metering locations, and at up to 5 of the 8 lift stations.

Task 7 – Sewer Manhole Survey (OPTIONAL)

This is an optional item to survey and dip 300 sewer manhole inverts. The manholes will be surveyed using the Orange County Surveyor's Horizontal and Vertical GPS Network. If authorized, this task would be performed prior to Task 6. The budget estimate is for labor at prevailing wage and does not include traffic control or permits.

<u>Task 7 Deliverables</u>

- GIS file with sewer invert data.

<u>Task 7 Assumptions</u>

- Assumes surveys can be performed on 10 manholes per day over a duration of 30 field days.

Task 8 – Dry-weather Flow Monitoring

Dry-weather flow modeling is required to calibrate the hydraulic model of the wastewater collection system. For this task, Woodard & Curran will develop a flow monitoring plan and subcontract V&A to conduct flow monitoring in the collection system and at sewer lift stations.

Woodard & Curran will develop a plan for temporary flow monitoring in the wastewater collection system designed to isolate major sewer drainage basins and subbasins in the system and confirm flows in major trunk sewers.

Woodard & Curran will request assistance from the District if verification of system configuration is needed to define the meter locations (e.g., where existing mapping is not clear, or confirmation of flow direction at flow splits is needed).

V&A will perform sewer collection system flow monitoring at five (5) locations to collect dry- and (potentially) wet-weather flow data for a duration of eight (8) weeks. Flow meters will be area-velocity flow meters capable of collecting flow level and velocity measurements in free-flow and surcharged hydraulic conditions.

A 2-person V&A field crew with a fully equipped truck/van and necessary confined space entry (CSE)-equipment and flow monitoring equipment will install, field calibrate, and remove the flow meters. V&A is proposing to deploy flow meters equipped with an antenna for remote data monitoring and has included time for remote desktop data compilation and QA/QC on a weekly basis.

In the event of a storm, V&A will be prepared to conduct a thorough wet weather and inflow and infiltration (I&I) analysis, allowing W&C to quantify the I&I in the collection system and identify locations where I&I may exist.

V&A's proposal assumes that flow monitoring will be performed at all eight (8) lift stations for a duration of one (1) month and will be performed separately from the sewer collection system flow monitoring. V&A will review the drawings and existing documentation for each of the eight (8) lift stations to determine the appropriate method for determining lift station volumetric flow monitoring and evaluating pump performance.

For constant-speed (on/off) lift stations, V&A will install "state" loggers on pump leads to conduct volumetric flow monitoring and to provide data necessary to evaluate pump performance. State loggers are installed on the pump leads and record when the pump turns on and off to within 0.5 seconds. Using the time elapsed during the wet well fill cycle (not the pumping cycle) and knowing the volume of the wet well being filled, a flow rate is calculated. Pump flow rates are calculated, and pump performance can be evaluated. This is similar to pump draw-down testing, except that it is performed over thousands of cycles across low and peak flow hydraulic conditions of the flow monitoring study.

For lift stations with variable-frequency drive (VFD) controls, V&A will consider other options to conduct lift station flow monitoring, such as open-channel flow monitoring of lines entering the lift station, operations/controls adjustments, etc.

<u>Task 8 Deliverables</u>

- Flow monitoring plan (Woodard & Curran).
- Collection System Flow Monitoring Data Deliverable and Report (V&A).
- Lift Station Flow Monitoring data in 15-minute intervals in Excel format (V&A).
- Task 8 Meeting (virtual) including agenda, PowerPoint slides, and notes.

<u>Task 8 Assumptions</u>

- District will assist in verification of system configuration for the Flow Monitoring Plan and provide any known information concerning bypasses, overflows, critical surcharge areas, and maintenance habits that may impact the flow monitoring sites.
- The number of meters or data loggers may be adjusted based on discussions with the District
- District Collection System Operations staff will accompany the V&A team during the site reconnaissance
- Installation and in-situ calibration of 5 flow meters is anticipated to take approximately one 8-hour day.
- District will clean sewer line if it is dirty and/or debris is evident to minimize hydraulic deficiencies, or an alternate location will be selected.
- Budget includes five (5) traffic control plans, encroachment permit applications, traffic control field support during meter installation (1 day), interim maintenance visits (3 days), and removals (1 day) for a total of five (5) days. Budget for traffic control shall be considered contingency and actual costs will be determined upon selection of flow monitoring locations.

Task 9 – CCTV Sewer Inspection (OPTIONAL)

If authorized, Closed Circuit Television Video (CCTV) inspection of sewer pipelines will be provided using NASSCO PACP CCTV Inspection software. The information gathered from the CCTV shall be utilized to evaluate the condition of these assets.

Task 9 Assumptions

- Pipes are clean and ready for inspection. For an additional fee, cleaning can be provided prior to video inspection to make it easier for the camera to pass through each reach.
- Price is based on 195,000 LF of sewer pipeline

Task 10 – Capital Improvement Phasing Plans

Woodard & Curran will incorporate the recommended system improvements to meet the District's evolving needs from Tasks 5, 6, 9, 11, and 13 to develop capital improvement phasing plans for the water, non-domestic water, and wastewater systems.

Task 10 Deliverables

- Capital Improvement Phasing Plans TM, draft, in electronic format.
- Two (2) Task 10 Meetings (virtual) including agenda, PowerPoint slides, and notes.

Task 11 – Condition Assessment

Subtask 11.1 – Desktop Condition Assessment: Woodard & Curran will review and consolidate asset data into a centralized asset inventory database to perform a desktop condition assessment of water, non-domestic water, and sewer facilities.

Subtask 11.2 – Lift Station Condition Assessment and Corrosion Evaluation: V&A will perform condition assessment and corrosion evaluation of the concrete and metallic surfaces at each of the eight (8) lift stations using the following methods:

a. Digital photographs of corrosion observations of the concrete and metal surfaces (minimum of 20 photographs will be obtained at each lift station). It is noted that the qualitative condition assessment observations are subjective and based upon the evaluator's expertise. V&A's scope will include concrete and metal surfaces within the wet wells, drywells, mechanical equipment, odor control equipment, building interior/exterior, backup generator rooms, and other associated equipment onsite. Record drawings will be used to identify and record locations of observed defects. The condition of concrete and metallic surfaces will be rated using the VANDA® Concrete and Metal Condition Indices (see attached Tables 1 and 2).

b. Concrete condition assessment by sounding to listen for discontinuities and penetration measurements with a chipping hammer (find depth to sound material).

c. Measure the surface pH of the concrete surfaces. The pH of concrete can substantiate the levels of corrosion attack prevalent.

d. Measure the thickness of concrete protecting the reinforcing steel.

e. Perform ultrasonic thickness (UT) testing at up to 10 locations (or a minimum of 40 measurements) including safely accessible piping, structural supports, or other metallic surfaces at each lift station.

f. Pit depth measurements will be performed in areas where significant metallic corrosion pitting is observed and a UT measurement is not successful. A depth gauge will be used for pit depth measurements.

g. Coating condition will be assessed within the lift station on piping surfaces. Visual assessment of the coatings with notations of defect areas and severity in accordance with ASTM D610, Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces. Perform dry film thickness (DFT) testing on coatings (up to 10 locations) present on metal surfaces of equipment and piping at each lift station.

h. Careful notation of locations and size of defects within the lift station that may or may not require repair. Locations of defects will be noted from the access hatch/manway or other notable features in the lift station.

V&A will analyze the condition assessment nondestructive testing results and provide conclusions including VANDA® Condition Ratings. Recommendations for repair, rehabilitation, or condition monitoring will be provided.

Subtask 11.3 – DWTP Transmission Main Condition Assessment

The transmission main consists of three (3) miles of 16-inch diameter CML&C steel pipe from the DWTP to the Ridgeline/El Toro Pump Station. The transmission main has a history of breaks, including locations with visible cracks in the cement coating. The transmission main is primarily located along the Los Alisos Creek bike trail (not within public road right-of-way) and includes a creek crossing.

V&A proposes to perform the condition assessment of the transmission main in a phased approach, the first phase focused on a corrosion evaluation followed by more detailed condition assessment phase based on the findings of the initial corrosion evaluation. The first phase will be a non-destructive soil corrosivity investigation, which can be performed with the transmission main in service and does not require direct access to the pipeline. A combination of soil resistivity testing and cell-to-cell surveys along the alignment will assess the likelihood of active corrosion occurring on mortar-coated pipe materials. The corrosivity investigation will identify potential areas of corrosion where more focused condition assessment will be recommended as part of the Master Plan.

The findings from the desktop and visual condition assessments will be used alongside industry accepted standards/methods to estimate the remaining useful life of each asset and the cost of replacement.

<u>Task 11 Deliverables</u>

- Condition Assessment Report TM, draft, in electronic format.
- Task 11 Meeting (virtual) including agenda, PowerPoint slides, and notes.

<u>Task 11 Assumptions</u>

- The number of flowmeters and data loggers may be adjusted based on discussions with the District
- District Collection System Operations staff will accompany the V&A team during the site reconnaissance and lift station entry
- CSE and nondestructive testing of the wet well structures will only be performed if the District isolates and shuts down, dewaters, and cleans the structures. For well structures that cannot be safely entered, V&A will utilize pole-mounted camera for visual observation from top-side without entering the space.
- Assuming CSE can be performed at each lift station, V&A anticipates that the field work will be completed in eight (8) 8-hour days with a 3-person V&A crew. If CSE cannot be performed, V&A anticipates that up to two (2) lift stations can be assessed per day for a total of four (4) field days.

Task 12 – Hydraulic Schematics

Woodard & Curran will create or update hydraulic schematics of the domestic water, non-domestic water and sewer systems.

<u>Task 12 Deliverables</u>

- Hydraulic schematics for the domestic water, non-domestic water and sewer systems.

Task 13 – Recommend System

Woodard & Curran will evaluate and recommend current water, non-domestic water, and wastewater system design criteria.

Woodard & Curran will propose appropriate design and hydraulic criteria to be used for assessing the capacity of existing facilities and sizing new facilities, including pipe friction factors, maximum flow depth to diameter (d/D) ratios, minimum and maximum velocities, slopes, and depth of cover, and pump station reliable capacity. In developing criteria to be used for the Master Plan, Woodard & Curran will review the District's existing design criteria as compared to industry standards and standards used by other agencies. The proposed criteria will be reviewed and discussed with District staff.

Task 13 Deliverables

- Recommended Water, Recycled Water and Sewer System Design Criteria TM, draft, in electronic format.

Task 14 – Water Capacity Charges Update

Woodard & Curran will review the 2020 Water Capacity charges Update and develop a new methodology for setting these fees charged to developers. The scope will include:

- Review data on Assets, Values, with Depreciation ideally to be provided by the District.
- Utilize data on current capacity, current flows and loads, and required upgrades to the water and sewer systems identified in previous tasks needed preserve existing capacity. Data for the WWTP is to be provided by the District.
- Utilize data on anticipated growth in flows and loads, needs for additional capacity needed to support new development as determined in previous tasks and the estimated costs of that new capacity.
- Estimate the buy-in portion, which is the depreciated value (and upgrades needed that the current users are on the hook for), divided by the current flow, which existing users own and new users will need to pay their fair share for those common assets.
- Estimate the new capacity component which would be the Estimated cost of the Capacity Expansion, divided by the capacity provided.

Task 14 Deliverables

- Water Capacity Charges TM, draft, in electronic format.
- Two (2) Task 14 Meetings (virtual) including agenda, PowerPoint slides, and notes.

Task 14 Assumptions

- Capacity Charge update is intended to provide the District with an estimate of likely changes and does not include a Rate Study, Cost of Service Study or Financial Plan.

Task 15 – Updated Master Plan

This task involves compiling the work conducted as part of Tasks 1-14 into a complete package of the Updated Master Plan including Executive Summary, Maps and Exhibits for approval and adoption.

Subtask 15.1 – Draft Master Plan Report

Woodard & Curran will incorporate the findings and recommendations of the project into a comprehensive Updated Master Plan report with separate sections for the water, wastewater, and stormwater systems. The report appendices will contain supporting data including TMs, flow monitoring reports, model calibration graphs, model data and results tables, capacity deficiencies, and other pertinent information.

The report will also include:

- A description of the existing water system service area, storage, deficiencies, and a summary of the existing water system facilities, including sources, major transmission and distribution pipelines, storage, pump station, and blending stations.
- A description of the existing sewer system service area, individual pipe capacities and current use, deficiencies, and facilities; including collection system pipelines, trunk sewers, lift stations, force mains, and connections with other municipalities.
- A description of the existing stormwater collection and historical seasonal rain events and flooding within the service area.
- Separate maps of the water, wastewater, and stormwater systems with proposed development project locations identified and labeled.
- Separate maps of the water, wastewater, and stormwater systems with capacity deficiencies and potential improvements identified and labeled.
- A map of the stormwater system illustrating the Impact Fee areas along with results from the existing and future hydraulic models.

Subtask 15.2 – Final Master Plan Report

Woodard & Curran will prepare a final Updated Master Plan report, which incorporates the District's comments on the various TM provided under Tasks 2, 5, 6, 10, 12, 13 and 14. TMs provided under Tasks 3, 4, 8 and 11 will be included as Appendices. The Final Updated Master Plan report will serve as a basis for future master plan updates.

Subtask 15.3 – Transfer of Models and Documentation

We understand that it is the District's intent to maintain the water, wastewater, and non-domestic computer models in-house for future analyses of the District's systems. Upon completion of the project, Woodard & Curran will transfer the updated hydraulic models to the District and advise the District of any hardware or software requirements necessary to efficiently utilize the model for future system analyses. We will hold workshops with District modeling staff to provide training and ensure a smooth transfer of all models and documentation.

Task 15 Assumptions

- District to obtain their own software licenses.

Task 15 Deliverables

- Draft Updated Master Plan Report.
- Final Updated Master Plan Report.
- Water, wastewater, and non-domestic hydraulic model files and documentation to be prepared as part of the model update TM tasks.
- Two (2) Task 15 Meetings (virtual) including agenda, PowerPoint slides, and notes.
- Three (3) 2-hour workshops with District modeling staff (1 workshop per model).

Task 16 – Project Management and Board of Directors Presentation

Woodard & Curran recognizes that communication and coordination between the project team members and the District and other stakeholders are key factors in the success of this project. Items included under this task to ensure successful project delivery include regularly scheduled conference calls with the project team to share information and discuss project progress.

The following activities are included:

- Kickoff Meeting – Woodard & Curran will conduct a kickoff meeting with District staff to discuss the project scope, approach, schedule and assumptions, communications protocol, and initial data needs for moving forward with the master planning and condition assessment activities (see Task 1).
- Project Communications – In addition to the Task meetings listed under individual tasks, Woodard & Curran will participate in periodic progress meetings with the District to discuss project progress, key assumptions, findings, outstanding issues, and next steps. For budgeting purposes we have assumed 4 progress meetings in addition to the meetings previously discussed.

Progress Reporting – Woodard & Curran will prepare and submit monthly progress reports and invoices to summarize and track project activities and budget/schedule status.

Woodard & Curran will prepare a presentation to the District's Board of Directors using PowerPoint or similar digital slide format. Presentation length is assumed to be up to 30 minutes.

Task 16 Deliverables

- Presentation to Board of Directors including PowerPoint slides in person.
- Monthly invoices and project progress reports.

Section 3

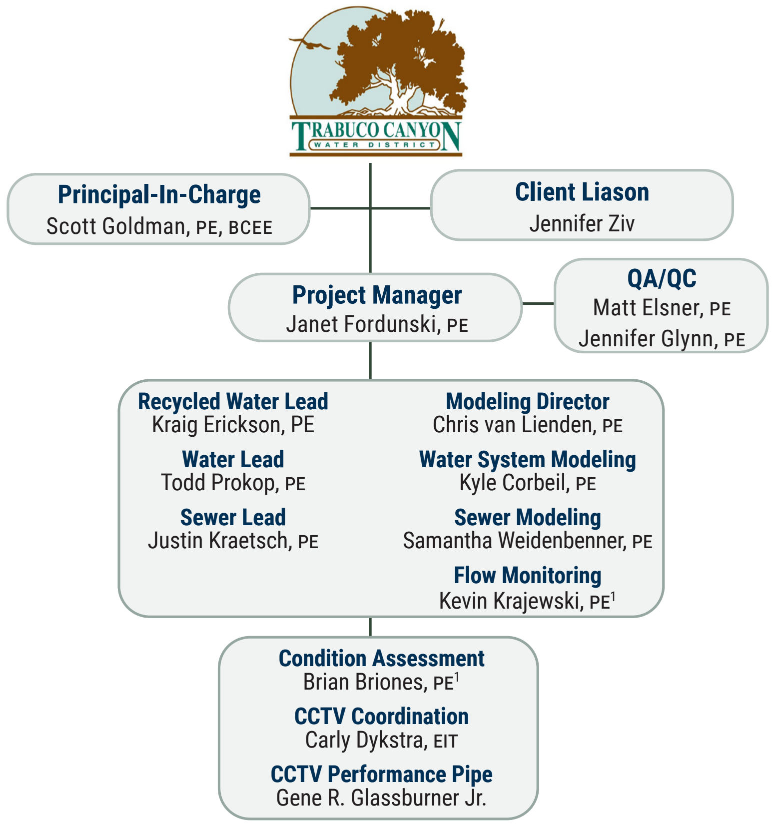
Team

Section Three
TEAM

Our staff are specialists in their fields, offering in-depth understanding of cutting-edge technology, astute problem solving, multidisciplinary engineering, and expert regulatory guidance. Our company has over 1100 highly-qualified professionals from 28 office locations across the United States, including seven offices in California.

Woodard & Curran has assembled a qualified and experienced team to collaborate with the District on the Master Plan and Condition Assessment Study. The adjacent organizational chart demonstrates the depth and breadth of resources available to the District. Our proposed Project Manager, Janet Fordunski, has over 15 years of experience working with clients on water resource project management, planning, design, permitting, and construction administration projects. Proposed Principal-In-Charge, Scott Goldman, specializes in providing tailored solutions that meet a variety of client objectives. Scott will help guide the team and ensure Woodard & Curran's resources are focused on this project.

Our key team members are highlighted on the following pages. Detailed resumes for all team members are provided in the Appendix.



Subconsultants
1. V&A Consulting Engineers, Inc.
2. Performance Pipeline Technologies

Janet Fordunski, PE | Project Manager

Janet has 15 years of experience in water resource project management, planning, design, permitting, and construction administration. Her experience includes recycled water, potable water, and wastewater facilities for clients throughout the southwestern United States in the municipal, tribal, and private sector. Janet's wide-ranging knowledge of groundwater, potable water, recycled water and wastewater systems, pipelines, instrumentation and controls, pump stations, and operations makes her an asset for managing water infrastructure projects.

Scott Goldman, PE | Principal-In-Charge

Scott has 36 years of experience in the planning, design, and construction of a variety of water, wastewater, and recycled water projects. He has served as project manager for various master plans, design of water and wastewater treatment plants, pump stations, and computer modeling of water, wastewater, and recycled water systems.

Matt Elsner, PE | QA/QC

Matt has over 27 years of experience with recycled water, water quality, and water conservation projects. Prior to joining Woodard & Curran, Matt was a principal civil engineer with a major public utility in Southern California and a civil engineer with a public water utility in southern Arizona. He has served as editor of the WateReuse Association Los Angeles section newsletter since its inception in 2010.

Jenn Glynn, PE | QA/QC

Jennifer has 24 years of a wide-range of experience in infrastructure design and construction, including pipeline condition assessment and pipeline rehabilitation. She is responsible for the condition assessment and design of over 120 miles of pipeline ranging in size from 2 inches to 108 inches in diameter. Jennifer has successfully managed projects from conception to completion, many of which required special attention to sensitive issues, including endangered species habitat preservation. She also has experience with design of pipelines within utility laden heavily trafficked corridors. Jennifer has been responsible for preparing plans and specifications; permitting; cost estimating; managing project budget and schedules; and coordinating and negotiating with state, local and federal agencies. She is a recognized expert in the field of trenchless technology and focuses on using the most advanced technologies in the field.

Jennifer Ziv | Client Liaison

Jennifer has over 25 years of experience as an Environmental Planner. Her broad skill set serves local, state, and federal agencies including many municipalities and water districts in California. She has expertise in compliance with CEQA/NEPA documentation with a focus on water, wastewater, and reuse projects. She also has experience with National Pollutant Discharge Elimination System (NPDES) storm water permitting and compliance (municipal, industrial and construction), and US Army Corps of Engineers Clean Water Act compliance (Section 404 and 401 permits) and California Department of Fish and Game Code Section 1600 Agreements.

Kraig Erickson, PE | Recycled Water Lead

Kraig has 18 years of experience and participates in all aspects of project implementation, from planning through design and construction services. He has provided design and construction management services for pipeline, pump station, treatment and reservoir projects for recycled water, potable water, storm drainage, and wastewater systems. His areas of specialty include recycled water conversions for irrigation and industrial customers, pipeline design, construction cost estimating, condition assessment inspections, and construction management for infrastructure projects. He is experienced with condition assessment and rehabilitation projects for pipelines, reservoirs, pump stations and wastewater treatment facilities, as well as being a certified inspector for cured-in-place pipeline relining. Kraig has engineering experience with GIS, Auto-CAD, and hydraulic modeling software. Kraig leads Woodard & Curran's recycled water customer retrofit team. He has coordinated with State Division of Drinking Water and County Health Departments on numerous recycled water conversion projects.

Todd Prokop, PE | Water Lead

Todd has over 12 years of experience in drinking water distribution system and treatment process design for clients in the municipal and private sectors. Projects include the development of distribution system upgrades, pump stations, chemical feed stations, and chemical comparisons. Todd has developed a comprehensive knowledge of water distribution system engineering.

Justin Kraetsch, PE | Sewer Lead

Justin has over five years of experience and provides services in water, wastewater, and recycled water infrastructure. He has experience providing project management, design, bid support, and construction support services for pump station and pipeline design, water/wastewater treatment design and plant retrofits, and pipeline rehabilitation. Justin was responsible for designing improvements to four critical inverted sewer siphon facilities in Irvine Ranch Water District's collection system. He was also the project engineer for the preliminary and final design of over 5 miles of 8-inch to 12-inch diameter gravity sewer, approximately 3,000 feet of 4-inch and 6-inch sewer force main, six sewer pump stations, over 5 miles of 4-inch to 8-inch diameter recycled water pipelines, and recycled water storage and pump facilities for the City of Malibu.

Chris van Lienden, PE | Modeling Director

Chris has experience in water, wastewater, and stormwater infrastructure projects, including system evaluation, modeling, and design. He is currently the operations lead for Woodard & Curran's hydraulic modeling and master planning group in California and has led hydraulic model development for a variety of project sizes and types for municipal agencies throughout California. Chris has extensive experience in data analysis and report writing, and technical software skills including InfoWorks CS and ICM, WaterGEMS, H2Omap Water and Sewer, InfoWater, InfoSewer, InfoSWMM, HEC-RAS, ArcGIS, and other analysis tools. Over the past 10 years, Chris has completed model development and master plans for Central Contra Costa Sanitary District (Central San), City of San Mateo, Town of Hillsborough, City of Roseville, Delta Diablo Sanitary District, Fair Oaks Sewer Maintenance District (San Mateo County), Novato Sanitary District, and supported many others.

Kyle Corbeil, PE | Water System Modeling

Kyle is a Technical Manager with 17 years of experience in water and wastewater treatment, water distribution system design and evaluation, geographic information systems (GIS), and site-civil engineering for municipal and industrial clients. He performs evaluation and design work for wastewater and water treatment systems, treatment system upgrades, process and instrumentation design, hydraulic distribution system modeling, life cycle cost analysis, capital improvement planning, and various aspects of site-civil design. He also prepares specifications, bid documents, and cost estimates, provides construction administration and oversight, and technical assistance for a variety of drinking water treatment and distribution applications.

Samantha Weidenbenner, PE | Sewer modeling

Samantha has nine years of experience in wastewater and stormwater system planning, modeling, and design. She has extensive experience in modeling and analyzing wastewater collections systems. Samantha's experience includes sizing storage tunnels and plan preparation for the separation of combined sewer systems into sanitary and stormwater systems. Recently, her work has focused on construction administration and feasibility designs for funding. Samantha has also managed emergency response plan creation, mapped wastewater district customer complaints, sized air valves, developed pedestrian trail signage, and designed ADA compliant accessible ramps.

Carley Dykstra | CCTV Coordination

Carley has over a year of experience as an engineer in Woodard & Curran's wastewater practice working on a variety of services including collection system condition assessment, risk analysis, infiltration and inflow assessment and rehabilitation, facility planning, and asset management. She has experience planning and overseeing the construction of sewer system rehabilitation including gravity and pressurized systems.

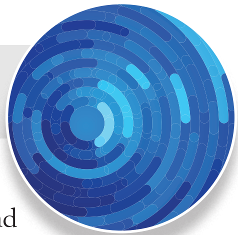
Kevin Krajewski, PE (V&A) | Flow Monitoring

Kevin's expertise includes flow monitoring and analysis of inflow and infiltration (I/I) into collection systems, including development of synthetic I/I hydrographs and estimate of peak wet weather flows for design storm events. He has served as the QA/QC advisor and data manager and project manager on hundreds of projects for V&A throughout California and the Western United States.

Brian Briones, PE | Condition Assessment

Brian is licensed as a civil engineer with more than 19 years of experience working in condition assessment and design of water and wastewater facilities including cathodic protection systems. He has completed projects throughout Southern California including planning, design, and condition assessments of large-diameter pipelines, pump stations, water treatment, water storage, and pressure control/hydroelectric facilities.

Gene R. Glassburner Jr (Performance Pipeline Technologies) | CCTV Performance Pipe



Gene has successfully cleaned, CCTV Inspected, installed and supervised over 3 million linear feet of trench less sewer and storm drain installations using the following methods: fold and form PVC pipe lining, slip lining with HDPE pipe, and CIPP pipe. He has completed thousands of sectional repairs and installed using CIPP UV Light cured pipe and link pipe sleeves repair patches. Additional responsibilities have included applying protective coatings for concrete structures, steel digesters and concrete manholes, chemical grouting water infiltration in pipe's structures and manholes.

Section 4

Experience and References

Section Four

EXPERIENCE AND REFERENCES

The following is a list of comparable projects completed by Woodard & Curran.

Water System Master Plan Update | Marin Municipal Water District, CA

The vast geographic extent and varied topography of Marin Municipal Water District results in a large asset inventory relative to the District's ratepayer base. With these unique challenges, Woodard & Curran is developing a comprehensive Water System Master Plan that balances the critical need to replace aging infrastructure with prioritizing affordability and system reliability. The Water Master Plan will serve as a vital tool that will help chart a sustainable course forward to maintain infrastructure in response to changing demands. The District selected Woodard & Curran to develop its Water Master Plan based on our key differentiators:

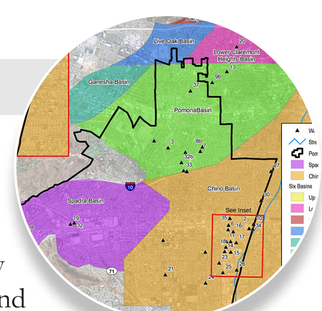
- Experienced, multi-disciplinary project team
- Comprehensive understanding of the District's needs and challenges – Woodard & Curran's key strategy leverages rehabilitation and replacement to position the District for long-term sustainability and resilience.
- Track record of successful project implementation and knowledge of the District's system.

Point of Contact: Lucy Croy, Water Quality Manager, Marin Municipal Water District; 415.945.1455, lcroy@marinwater.org

Civic Center Wastewater Treatment Plant | City of Malibu

Woodard & Curran performed the planning and design for this high visibility, multi-benefit project that will improve water quality in Malibu Creek, Malibu Lagoon, and Surfrider Beach. The Civic Center Wastewater Treatment Facility (CCWTF) consists of a new membrane bioreactor wastewater treatment plant, over 16 miles of new wastewater collection and recycled water distribution pipelines, multiple pump stations, and recycled water percolation ponds and injection wells. The CCWTF is initially sized for 0.225 mgd with build-out capacity of 0.5 mgd. The new centralized sewer collection system includes 9,000 feet of gravity sewer and 4,500 feet parallel force mains, including two lift stations. The recycled water distribution system consists of a 3-mile distribution system and customer connections to utilize recycled water for irrigation. All pipelines will be underground in public right-of-ways (streets) and in easements. All pump stations will be located below ground, also on public right-of-ways and/or easements.

Point of Contact: Rob Dubuox, Assistant Public Works Director, City of Malibu; 310.456.2489, ext. 339, rdubox@malibucity.org



Pomona Integrated Plan | City of Pomona, CA

Since 2009, Woodard & Curran has provided water resources planning services to the City of Pomona. Starting with the successfully adopted 2010 UWMP and original Integrated Water Resources Plan (IWRP), our proposed team members have worked closely with staff to develop innovative integrated planning processes that meet a variety of external regulatory requirements and giving future direction for the City's water and wastewater utility. In 2018, we completed a strategic plan, an update to the IWRP and water and wastewater plans – where we helped the City define a path forward to optimize its treatment and use of local groundwater, surface water and recycled water resources to minimize the need for more expensive and less reliable imported water supplies, as well as a programmatic approach to utility management and implementation of future capital improvements.

The work included a comprehensive evaluation of the City's water and wastewater operations, including the following elements: strategic planning workshops to define goals and objectives for the utility, address organizational and operational inefficiencies, develop the framework for real-time data management, define strategies and key performance indicators for optimizing asset management and utility operations, water resources optimization, providing an update of the previous integrated planning with a focus on increasing recycled water use and leveraging excess supplies for possible outside sales, potable water system master plan, wastewater collection system master plan, and prioritized CIP for near-term (2020) and long-term (2030),

Point of Contact: Tim Hampton, Senior Water Resources Manager, City of Pomona; 91766; 909.620.2251, Tim_Hampton@ci.pomona.ca.us

Water Master Plan Update | Town of Windsor

Woodard & Curran updated the Town of Windsor's Water Master Plan to create a strategy that addresses future water supply requirements; provides a long-term capital improvement program supported by the latest hydraulic modeling software; serves as the basis for the Town's rate and fee updates and impact studies; and evaluates sustainable, long-term water supplies. Our four-part project approach included (1) quantification of water demand, (2) updating the model and analyzing the water system, (3) evaluating and identifying water supply and treatment options, and (4) developing a comprehensive CIP program.

Point of Contact: Sandi Potter, Acting Director of Public Works, Town of Windsor; 707.838.5329, spotter@townofwindsor.com

Sewer Master Plan Update | City of San Clemente

Woodard & Curran updated the City of San Clemente's Sewer Master Plan (SMP) that consists of analyzing five specific areas of the City's wastewater collection and treatment facilities. Services included evaluating the capacity of the Talega community to determine impact if current and future wastewater flows can be sent to the City's wastewater collection system. Woodard & Curran also provided a capacity evaluation and identifed improvements needed for the City's Beach Trunk sewer line to meet future flows. At the City's Wastewater Treatment Plant, Woodard & Curran identified new technologies for processing biosolids and made recommendation to the City for near-term (10–15 years) and provided the Capital Improvements Program budget. The City's Segunda Deschecha Canada flood control channel diverts up to 1.0 MGD of dry weather flows to the City's Wastewater Treatment Plant where it discharges to the City's land outfall. Woodard & Curran looked at treatment options for the urban runoff such that it could be introduced directly in the City's recycled water system. Woodard & Curran also conducted an urban runoff diversion study that focuses on diverting treated water at the Poche Beach runoff treatment plant into the City's land outfall. Woodard & Curran also evaluated the potential for recycled water seasonal storage in conjunction with Santa Margarita Water District.

Point of Contact: Dave Rebensdorf, Deputy Public Works Director, City of San Clemente; 949.361.6130, rebensdorfd@san-clemente.org

Section 5

Schedule

TCWD
Proposed Project Schedule & Workplan

Proposed Schedule & Workplan
Trabuco Canyon Water District Master Plan and Condition Assessment Study

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Data Gathering and Review	★																	
2 Water Source Evaluation		★																
3 Hydraulic Model Software Updates																		
4 Calibrate Water and Non-domestic Hydrualic Models			★															
5 Demand Analysis Water and Non-domestic Systems							★											
6 Develop Wastewater Hydraulic Model				★														
7 Sewer Manhole Survey (Optional)																		
8 Flow Monitoring					★													
9 CCTV Sewer Inspection (Optional)																		
10 Capital Improvement Phasing Plans											★	★						
11 Condition Assessment						★												
12 Update / Create Schematics																		
13 Recommend System Design Criteria																		
14 Review / Update Water Capacity Charges													★	★				
15 Master Plan															★		★	
16 Project Management and Board Presentation								★	★	★						★		☺

★ Kickoff / Task Meeting ☺ Board Presentation

Section 6

Conflict of Interest

Section Six

CONFLICT OF INTEREST

Woodard & Curran certifies that we have no actual, apparent, direct or indirect, or potential conflicts of interest in performing the work related to this RFP.

Section 7

Insurance

WOOD&CU-01 ABERCH

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/13/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	
Ames & Gough 859 Willard Street Suite 320 Quincy, MA 02169	CONTACT NAME: PHONE (A/C, No, Ext): (617) 328-6555 FAX (A/C, No): (617) 328-6888 E-MAIL ADDRESS: boston@amesgough.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Continental Casualty Company (CNA) A, XV	20443
INSURER B : American Casualty Co of Reading, PA A(XV)	20427
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED

Woodard & Curran, Inc.
41 Hutchins Drive
Portland, ME 04102

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:			6014561812	2/23/2021	2/23/2022	EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 500,000
							MED EXP (Any one person)	$ 15,000
							PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 2,000,000
							PRODUCTS - COMP/OP AGG	$ 2,000,000
								$
A	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY			6014561843	2/23/2021	2/23/2022	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB / OCCUR EXCESS LIAB / CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE	$
							AGGREGATE	$
								$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		WC712160450	2/23/2021	2/23/2022	X PER STATUTE / OTH-ER	
							E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
A	Professional Liab			114135520	2/23/2021	2/23/2022	Per Claim	2,000,000
A				114135520	2/23/2021	2/23/2022	Aggregate	2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

If AI box is checked, GL Endorsement Form# CNA75079XX, Auto Endt Form# SCA23500D to the extent provided therein applies and all coverages are in accordance with the policy terms and conditions.

Evidence of Insurance.

CERTIFICATE HOLDER

Trabuco Canyon Water District
32003 Dove Canyon Dr.
Trabuco Canyon, CA 92769

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Appendix

JANET FORDUNSKI, PE
PROJECT MANAGER

Professional Profile

Janet has 15 years of experience in water resource project management, planning, design, permitting, and construction administration. Her experience includes recycled water, potable water, and wastewater facilities for clients throughout the southwestern United States in the municipal, tribal, and private sector. Janet's wide-ranging knowledge of groundwater, potable water, recycled water and wastewater systems, pipelines, instrumentation and controls, pump stations, and operations makes her an asset for managing water infrastructure projects.

Education

- Masters, Civil Engineering, California State University-Long Beach
- Bachelors, Civil Engineering, Massachusetts Institute of Technology

Registrations

- Professional Engineer - CA, C51493

Professional Associations

- American Society of Civil Engineers
- WateReuse California Inland Empire Chapter, President

Related Experience

Trabuco Canyon Water District, Trabuco Canyon, Orange County, CA – Municipal Well Feasibility Study. Janet was the Project Manager for a feasibility study evaluating a new local groundwater supply in the vicinity of Trabuco Creek (also known as Arroyo Trabuco) near the Cleveland National Forest in Orange County. The purpose of this study was to guide the District's decision on pursuing a well construction project. Work included estimating the potential groundwater supply and developing planning level capital and O&M costs for conveyance and treatment infrastructure. The study also identified potential technical and institutional feasibility issues, including water rights considerations, estimated well yield and water quality, flood potential and mitigation, and environmental impacts. Several site alternatives and project options were presented along with unit costs for potable and non-potable supply alternatives.

Los Angeles County, CA - Department of Public Works On-Call Contract. Project Manager of a $1.5M contract for engineering design, permitting, and construction administration services for the design and rehabilitation of several potable water supply and wastewater facilities owned by the Los Angeles County Fire Department. The potable water facilities supplied water to Fire Camps, which are facilities operated in conjunction with the Department of Corrections to train over 100 inmates to fight wildfires in remote areas of the Angeles National Forest. Existing groundwater supplies were considered by the Los Angeles Regional Board to be under the direct influence of surface water. Janet worked in cooperation with the Division of Drinking of Water to design a cartridge filter system that was LT2-compliant, low cost and straightforward for the County to operate and maintain. Janet also worked with the Regional Board Groundwater Division to recommend relocation of a water supply well to reduce the incoming TDS to the potable water system and achieve water quality objectives from discharge of effluent from an onsite wastewater treatment facility to the Santa Clara River Valley East groundwater basin. One urban fire station in the City of Compton required a low pressure sewer forcemain connection to an existing gravity sewer to replace a failing onsite wastewater treatment system. The 1,000-foot forcemain design was complicated by numerous existing utilities including water mains, fiber optics, high pressure gas lines, and a railroad crossing, which required significant utility research and agency coordination.

Santa Fe Irrigation District (Lead Agency), CA – Recycled Water Expansion Plan Development. Project Manager for a study to identify alternatives for expanding recycled water use in five water/wastewater districts in northern San Diego County: the Santa Fe Irrigation District, San Dieguito Water District, San Elijo Joint Powers Authority, Olivenhain Municipal Water District, and Leucadia Water District. The study developed project alternatives for a new potable reuse project using surface water augmentation in the San Dieguito Reservoir and/or expanding the existing non-potable system. Woodard &

Curran teamed with another firm on developing the size and phasing of the potable reuse project under the current regulatory framework and institutional complexities. Project work includes identifying additional recycled water supplies and developing project alternatives and costs.

California Water Service Company, CA – Feasibility Study for Menlo Country Club Recycled Water Project. As Project Manager, identified a project for supplying recycled water from Silicon Valley Clean Water through Redwood City to both the Menlo Country Club and Woodside High School. The golf course and school currently irrigate with potable water from the California Water Service Company and the San Francisco Public Utilities Company. Project work included siting an alignment for a new pipeline within the Cal Water service area from Redwood City with pump stations and a storage tank. Planning level cost estimates and unit costs were calculated for the proposed project and compared to the current cost of potable water to identify economic feasibility.

Eastern Municipal Water District, CA – The Lakeview Subbasin Groundwater Banking Feasibility Study. Project Manager for this high-level evaluation of the feasibility of banking imported water from the Metropolitan Water District of Southern California in the Lakeview Subbasin via surface infiltration. The Subbasin underlies the valley between the Bernasconi Hills and the Lakeview Mountains east of the Perris Reservoir, which is the southern terminus of the California State Water Project. The study developed two conceptual recharge projects and estimated planning-level costs, including capital and annualized operations and maintenance costs. Groundwater modeling at the two sites was performed to estimate the range of recharge and extraction feasible. Based on modeled recharge amounts, the unit cost of water was calculated and presented on a cost curve. The study results showed that groundwater banking was feasible and provided support for further work. Benefits of a groundwater banking project in the Lakeview Subbasin are twofold: the groundwater bank would provide a new supply of potable water that could be replenished using imported water, and the additional water would alleviate the migration of lower quality groundwater into the Lakeview Subbasin from the adjacent Perris South Subbasin. The study also identified a potential regional partnership with the Riverside County Flood Control and Water Conservation District.

Olivenhain Municipal Water District (OMWD), CA - San Diequito Valley Brackish Groundwater Desalination. Deputy Project Manager for development of project alternatives for product water conveyance and distribution system integration and performing economic analyses for the preferred alternatives. The goal of the study is to develop local brackish groundwater in the San Diequito Basin into a locally-sourced potable water supply of 1,600 AFY. Woodard & Curran's role in the study is to develop the brine management alternatives and product water conveyance for the groundwater desalter. Work includes development of a suite of alternatives for extraction, treatment, brine management, and conveyance that will be analyzed to form feasible project alternatives.

San Elijo Water Reclamation Facility, Cardiff-by-the-Sea, CA – Stormwater Opportunities Analysis. Task Manager studying opportunities for stormwater infiltration on an underutilized area at the WRF site. Available stormwater runoff was calculated, and geotechnical information was reviewed to evaluate recharge rates for above-ground and underground infiltration systems. The analysis included hydrology and hydraulic calculations, concept design, cost estimates, cost-benefit analysis of different infiltration methods, and a summary of recommendations.

City of Los Angeles Bureau of Engineering, CA – Donald C. Tillman Water Reclamation Plant Administration Building Chemical Safety Upgrades. Project Manager designing a treatment system for a water feature adjacent to the Administration Building and Japanese Garden that uses recycled water from the adjacent Donald C. Tillman WRP. The design also includes renovation of sump pumps and alarms and safety upgrades to the surrounding hardscape.

Surprise, AZ - Recycled Water Master Planning, SPA 4, 5 and 6. Design Engineer for preparation of planning documents for the City of Surprise and the Maricopa Association of Government (MAG) for new wastewater recycling facilities in Special Planning Areas 4, 5 and 6 located northwest of the existing city. Planning documents included amendments to MAG 208 Regional Water Quality Management Plan and preliminary engineering design reports. Wastewater treatment processes met Arizona's Title 18 Class A+ Reclaimed Water Standards suitable for reuse and recharge. The water recycling facilities were designed with percolation ponds for recharge of the underlying aquifers as well as outfalls for discharge to surface water. Permit applications included Arizona Department of Environmental Quality Aquifer Protection Permits (APPs) and reclaimed water general permits.

SCOTT GOLDMAN, PE, BCEE
PRINCIPAL-IN-CHARGE

Professional Profile

Scott has 36 years of experience in the planning, design, and construction of a variety of water, wastewater, and recycled water projects. He has served as project manager for various master plans, design of water and wastewater treatment plants, pump stations, and computer modeling of water, wastewater, and recycled water systems.

Scott has assisted his clients in identifying and obtaining funding through the State Revolving Fund (SRF) loan program, California Proposition 13 and Proposition 50 grants, and USEPA grant programs. He has been responsible for helping California agencies, including the cities of Oceanside and Escondido, the Yucaipa Valley Water District, and the Santiago County Water District, obtain approximately $200 million in SRF loans and other funding.

Education

- Masters, Environmental Engineering, University of Southern California
- Bachelors, Civil / Environmental Engineering, University of California-Los Angeles

Registrations

- Professional Engineer - CA, C 33041
- Professional Engineer - AZ, 18397
- Professional Engineer - NV, 10342
- Board Certified Environmental Engineer - American Academy of Environment, 02-2001

Professional Associations

- American Water Works Association (AWWA), Member
- Water Environment Federation (WEF), Member

Related Experience

City of San Clemente, CA - Recycled Water Retrofits and Program Development. Principal-in-Charge for the conversion of 30 public and private sites to recycled water use for irrigation in the City of San Clemente. Total irrigation demand to be converted to recycled water is 900 AFY for golf courses, parks, medians, schools, HOAs, and commercial irrigation. A key aspect of the project is the aggressive schedule to design and retrofit sites to coincide with the City's upgrades to the tertiary treatment system and make use of the available Metropolitan Water District recycled water retrofit rebate program. The project more than doubles the amount of recycled water produced at the City's wastewater treatment plant that will be available for new recycled water customers by September 2014.

Encina Wastewater Authority, CA - Comprehensive Asset Management Plan. As Principal-in-Charge, oversaw the preparation of annual updates to the Master Plan to establish an orderly approach to identifying and prioritizing annual rehabilitation of equipment. Starting in 2007 the planning process was modified to incorporate the comprehensive asset management planning process. Developed an asset register and inventory for all assets less than $50,000 in replacement value. Estimated useful life, remaining useful life, and replacement costs for all assets. Worked with District staff to implement a process to inspect and assess condition of assets prior to end of useful life to determine rehabilitation and replacement needs and schedule. Implemented a project prioritization process to rank competing rehabilitation and replacement projects for incorporation in the annual Master Plan. Each Master Plan update includes revising the previous fiscal year's report by listing new projects, evaluating alternatives, estimating project costs, revising the priority assignment and revising the implementation schedule.

City of Oceanside, CA - Recycled Water Master Plan. Principal-in-Charge providing oversight to the project team developing Recycled Water Master Plan for City of Oceanside. The Recycled Water Master Plan includes identifying, developing and evaluating three recycling water systems. The project provided a market assessment, development, feasibility analyses and refinement of the recycling water systems, hydraulic modeling, project phasing for recycled water system expansion, and development of the planning level CIP cost estimates.

Los Angeles Department of Water and Power, CA - Recycled Water Master Plan. Nonpotable Master Plan Manager responsible for managing the technical personnel and the senior technologist involved in development of the plan and for regular communication with the project manager, deputy project manager, and relevant LA DWP staff. Specific tasks include identification and assessment of customers, evaluations of potential nonpotable reuse system components, and supply options analyses. The project includes five planning efforts in the areas of indirect potable reuse, nonpotable reuse, satellite treatment, system reliability, and long-term recycling vision.

Yucaipa Valley Water District, CA - Recycled Water Project. Project Manager for the District responsible for water treatment, water production, water delivery, wastewater collection, wastewater treatment and recycled water delivery in the Yucaipa Valley. This project involved a review and update of the District's current Recycled Water Master Plans in conjunction with updates to the Water and Wastewater Master Plans. Responsibilities included coordinating system improvements for the District which required special considerations such as evaluating onsite facility, prioritizing identified future projects, developing cost estimates, as well as conducting a site assessment for the District's recycled water customers. Project included assisting with state and federal grant applications for implementation of Phase I of the system.

South Orange County Reclamation Authority (SOCRA), CA - Orange County Reclamation and Reuse Master Plan. Project Manager for the South Orange County Reclamation Authority (SOCRA), Municipal Water District of Southern California, Orange County Water District and the Coastal Municipal Water District of Orange County jointly participated in development of this project, with SOCRA as the lead agency. The project goal was to evaluate local reclaimed water systems and identify regional facilities to increase the reclamation potential in Orange County. The master plan included an evaluation of linking of existing and planned reclamation supplies, distribution and storage to improve reliability, increase flexibility and enhance the County's overall water resources.

Encina Wastewater Authority, CA - Master Plan for Rehabilitation and Major Improvement Projects. Project Manager for preparation of annual updates to the master plan to establish a systematic approach to adhering annual rehabilitation of equipment. Each update includes revising the previous fiscal year's report by listing new projects, evaluating alternatives, estimating project costs, revising the priority assignment, and modifying the implementation schedule. Starting in 2007, the Master Plan was expanded to incorporate an Assessment Management Master Plan to aid in overall facility coordination.

Lake Arrowhead Community Services District, CA - Water and Wastewater Master Plan Updates. Principal-in-Charge of updates including, field evaluation and identification of deficiencies in the existing wastewater and water treatment facilities, wastewater collection including 21 sewage lift stations, and water distribution including 19 water pump stations and reservoirs. Developed computer models of the water distribution and wastewater collection systems. Evaluated alternatives for upgrading and expanding the two wastewater treatment plants and two water treatment plants. The project resulted in the development of two Capital Improvement Programs for improvements to the water system and the wastewater system. Coordinated efforts with others preparing a Financial Master Plan and Supplemental Environmental Impact Report for the Master Plan updates.

Inland Empire Utilities Agency, CA - Integrated Resources Plan. Principal-in-Charge for preparation of an IRP to provide an overall strategy for meeting projected water demands within IEUA's service area through 2040. The IRP considered future demands, conservation opportunities, recycling opportunities, water replenishment prospects, the use of imported supplies, and local and regional planning, along with the associated economics of project implementation and system revenue, in an integrated fashion to determine the best path forward to achieve water reliability.

Eastern Municipal Water District, CA - Recycled Water Strategic Plan. Principal-in-Charge on this effort which involved implementing over 20,000 AFY of groundwater recharge via surface spreading, nearly 6,000 AFY (landscape irrigation) and maintaining 10,000 AFY (agricultural irrigation). The team integrated findings from other facilities plan reports.

JENNIFER ZIV
CLIENT LIASON

Professional Profile

Jennifer has over 25 years of experience as an Environmental Planner. Her broad skill set serves local, state, and federal agencies including many municipalities and water districts in California. She has expertise in compliance with CEQA/NEPA documentation with a focus on water, wastewater, and reuse projects. She also has experience with National Pollutant Discharge Elimination System (NPDES) storm water permitting and compliance (municipal, industrial and construction), and US Army Corps of Engineers Clean Water Act compliance (Section 404 and 401 permits) and California Department of Fish and Game Code Section 1600 Agreements.

Education

- Bachelors, Environmental Science, University of California-Berkeley
- Masters, Water Resource Management, University of Wisconsin-Madison

Related Experience

Trabuco Canyon Water District, Orange County, CA - Shadow Rock Detention Basin Urban Water Recovery Project. As Project Manager, managed modification of an existing flood control basin for a conjunctive use Urban Water Recovery System that captures, improves water quality, and reuses storm water and dry weather flows for beneficial use in the District's reclaimed water distribution system. Assisted in obtaining Section 404 and 401 and 1602 permits.

Trabuco Canyon Water District, Orange County, CA - Rose and Lang Wells Water Treatment Facilities Upgrade CEQA IS/MND. As Project Manager, prepared the CEQA IS/MND for construction of water treatment facility upgrades for two District-owned groundwater wells. Environmental analysis focused on biological resources of adjacent Trabuco Creek, visual effects, and short-term construction traffic and noise impacts.

Del Puerto Water District, CA – Del Puerto Canyon Reservoir Environmental Impact Report. EIR Coordinator currently responsible for managing the EIR team and providing QA/QC review for a proposed 82,000 acre-foot reservoir located along Del Puerto Creek in Stanislaus County, fronting Interstate 5, west of the City of Patterson. Project includes a main dam, three saddle dams, inlet/outlet works, pipeline, a pumping plant, electrical substation, relocated utility lines and a relocated roadway. The project will provide locally-owned south of Delta water storage to and from the Delta-Mendota Canal to provide a reliable source of water for agriculture and wildlife refuges in the DPWD and Project Partners' service areas. The EIR team, working closely with the engineering team, is conducting environmental review on a fast track basis to help meet US Bureau Reclamation grant funding application deadlines.

Eastern Municipal Water District (EMWD) – CEQA Adjunct Staff. During a 6-month period when EMWD was without CEQA staff, served as in-house CEQA adjunct staff to support the Directory of Environmental and Regulatory Compliance and ensure EMWD was fully supported in all aspects of CEQA compliance for their numerous water, wastewater, recycled water, storage and conveyance projects. Work included attending EMWD project meetings to discuss CEQA compliance strategies; managing environmental consultant tasks; reviewing consultant deliverables including IS/MNDs, Addendums, EIRs, and cultural and biological resources reports; ensuring CEQA noticing requirements were met; preparing categorical exemptions; interpreting permit compliance requirements, providing environmental documentation support for grant compliance requirements, assisting with Board presentations and reports, and providing support on AB 52 compliance. Major projects included Murrieta Booster Pump Station IS/MND (completed), San Jacinto Raw Water Conveyance Facilities IS/MND (completed), Addendums to IS/MNDs for the Temecula Valley Recycled Water Pipeline (complete) and

Eucalyptus Booster Station (completed); Goetz Road Tank and Transmission EIR (in progress); and Sky Canyon Sewer IS/MND (in progress).

Coachella Valley Water District, CA – East Coachella Valley Water Supply Project: Saint Anthony Mobile Home Park Water Consolidation Project IS/MND and Valley View Mobile Home Park Water Consolidation Project IS/MND. CEQA project manager for preparation of two IS/MNDs that addressed extending potable water supply to disadvantage communities in the east Coachella Valley that currently rely on shallow groundwater wells that have elevated levels of arsenic and fluoride. The IS/MNDs were completed in 23 weeks. Woodard & Curran's CEQA team worked closely with our in-house engineering and funding teams on concurrent Preliminary Engineering Reports and funding applications. The IS/MNDs involved stakeholder workshops with the State Water Resources Control Board, a potential funding entity, and the communities and tribal groups that the Projects would serve. The public notices were drafted in both English and Spanish to ensure inclusion of all members of the public in the public review process. Noticing was coordinated with Coachella Valley Water District such that stakeholders, local newspapers, and the State Clearinghouse would receive notices for both projects and their benefits at the same time, to avoid confusion.

Olivenhain Municipal Water District (OMWD), CA - 153A Recycled Water Pipeline Extension IS/MND and San Dieguito Valley Groundwater Desalination Design Pilot IS. As CEQA Technical Support, assisted in preparation of IS/MND for a design test pilot study to evaluate the feasibility of desalinating brackish groundwater in the San Dieguito Valley groundwater basin. The San Dieguito Valley Groundwater Desalination Design Pilot project would conduct a one-year pump test, which would involve installation and operation of a test well, installation and operation of manganese pre-treatment equipment, and discharge of pump test water. The 153A Recycled Water Pipeline Extension would extend recycled water service from OMWD's existing recycled water pipeline near the existing recycled water meter at Morgan Run Club & Resort property to the eastern end of the Surf Cup Sports Fields property via Horizontal Directional Drilling (HDD) under the San Dieguito River.

City of Oceanside, CA - Oceanside Pure Water CEQA IS/MND. As CEQA Technical Support, assisted in preparation of an IS/MND for the construction and operation of an advanced water treatment (AWT) facility, conveyance pipelines, injection wells, monitoring wells, and backwash piping. The AWT facility would treat secondary effluent from the existing San Luis Rey Water Reclamation Facility for indirect potable reuse. The advanced treated water would be conveyed to injection wells where it would replenish the Mission Subbasin for later extraction and use as potable water

Olivenhain Municipal Water District (OMWD), CA - 153A Recycled Water Pipeline Extension CEQA IS/MND. As CEQA Hydrology/Water Quality Technical Support, assisted in preparation of an IS/MND for the expansion of recycled water pipeline to an existing potable water user (Surf Cup Soccer Fields) for irrigation purposes. The MND included evaluation of the recycled water pipeline alignment extending 1,400 feet beneath the San Dieguito River, constructed using horizontal directional drilling. Also, evaluated pumping effects to local well users.

Los Angeles Department of Water and Power (LADWP), CA - EIR for Groundwater Replenishment Project. As Technical Support, prepared Draft EIR hydrology /water quality section for proposed advanced water purification facilities at LADWP's Donald C. Tillman Water Reclamation Plant to provide up to 30 acre-fee/year of advanced treated recycled water for recharge at Hansen and Pacoima Spreading Grounds to supplement groundwater supplies. Evaluated hydrologic/water quality effects to the Los Angeles River and San Fernando Groundwater Basin.

City of Santa Ana Public Works Agency, CA - Santa Ana Delhi Channel Low Flow Diversion CEQA IS/MND. As Environmental Task Lead, prepared a CEQA Initial Study/MND for low flow diversion in the Santa Ana Delhi Channel, pump station and pipeline to divert dry weather flows from the channel to the Orange County Sanitation District regional sewer system and help reduce pollutant loads and trash to Upper Newport Bay, a state ecological reserve. The City of Santa Ana worked in collaboration with the cities of Costa Mesa and Newport Beach to help meet requirements of the MS4 Permit and Total Maximum Daily Loads (TMDLs).

CARLEY DYKSTRA, EIT

CCTV COORDINATION

Professional Profile

Carley has over a year of experience as an engineer in Woodard & Curran's wastewater practice working on a variety of services including collection system condition assessment, risk analysis, infiltration and inflow assessment and rehabilitation, facility planning, and asset management. She has experience planning and overseeing the construction of sewer system rehabilitation including gravity and pressurized systems.

Education

- Bachelors, Environmental Engineering, Worcester Polytechnic Institute (WPI)

Registrations

- 10 Hour Construction Training - OSHA
- Engineer In Training - MA, 26287

Related Experience

City of Lawrence, MA – Sewer System Evaluation Survey. Engineer responsible for the overall program management of a multi-year separated and combined sewer system evaluation project. The project involves the evaluation of approximately 40 miles of sewer system which includes sub-contractor management for CCTV inspection.

City of Lawrence, MA – On-Call Engineering Services. Lead Engineer for an On-Call Professional Services contract spanning wastewater, water, and stormwater projects. Projects have included emergency assessment, construction and rehabilitation of multiple major interceptor sewer segments, expedited design of critical infrastructure rehabilitation, and several illicit discharge abatements.

City of Groveland, FL – Clean Water Facility Plan. Staff Engineer responsible for aiding in Geographic Information System (GIS) mapping of sewer, water, and reclaimed water systems based on record drawings. Assisted in developing future flows and loads projections for the clean water system. Developed rehabilitation alternatives for components of the clean water system that will not meet the future flows and loads capacity requirements. Additional responsibilities included cost estimating for system upgrades and technical writing.

Town of Ipswich, MA – Asset Management Plan. Support Engineer responsible for determining wastewater asset information, including age, size, performance, and current condition. Aided in developing rating system for schedule maintenance/replacement and assigning replacement costs for each asset. Updated the Town's GIS mapping system to incorporate existing sewer assets.

City of Haverhill, MA – Sewer System Inspections and Recommendations. Engineer responsible for aiding in the coordination of sewer gravity main and manhole inspection programs to determine the sewer asset conditions. Assessed and evaluated sewer conditions to generate rehabilitation and improvement recommendations. Additional responsibilities included GIS mapping and technical writing.

CHRIS VAN LIENDEN, PE
MODELING DIRECTOR

Professional Profile

Chris has experience in water, wastewater, and stormwater infrastructure projects, including system evaluation, modeling, and design. He is currently the operations lead for Woodard & Curran's hydraulic modeling and master planning group in California and has led hydraulic model development for a variety of project sizes and types for municipal agencies throughout California. Chris has extensive experience in data analysis and report writing, and technical software skills including InfoWorks CS and ICM, WaterGEMS, H2Omap Water and Sewer, InfoWater, InfoSewer, InfoSWMM, HEC-RAS, ArcGIS, and other analysis tools. Over the past 10 years, Chris has completed model development and master plans for Central Contra Costa Sanitary District (Central San), City of San Mateo, Town of Hillsborough, City of Roseville, Delta Diablo Sanitary District, Fair Oaks Sewer Maintenance District (San Mateo County), Novato Sanitary District, and supported many others.

Education

- Masters, Civil & Environmental Engineering, University of California, Davis
- Bachelors, Chemical Engineering, University of California, Berkeley

Registrations

- Professional Engineer - CA, 75034

Related Experience

Town of Windsor, CA – Water Master Plan Update. Deputy Project Manager for the 2019 update of the Town's Water Master Plan. The Town of Windsor needed an update to their Water Master to reflect significant changes in the location and timing of future growth, and the available of additional water supplies. As the Town is in a fire prone area, the project included an evaluation of the Town's fire pressure deficiencies and potential distribution system vulnerabilities, and identified potential improvements. Chris led the model updates, which also included an update of the Town's existing and future demands, and is using the results of the analysis to develop a 20-year CIP.

City of Anaheim, CA – Water System Model Update. QA/QC Lead for the update of the City of Anaheim's water system hydraulic model. The previous model, with more than 31,000 links and 19 pressure zones, served as the basis to update the model using the latest InfoWater modeling software. The model was updated to reflect significant changes in the GIS database, and to incorporate up-to-date well and valve structure data. Demands and diurnal patterns were updated based on recent water consumption and production data, and the model was calibrated using a combination of fire flow tests and pressure logging devices recording diurnal pressure variations. As QA/QC lead, Chris reviewed the implementation of model revisions and confirmed calibration accuracy, and reviewed the model documentation.

Water Replenishment District of Southern California (WRD) - Hydraulic Analysis, Operational Efficiencies, and Optimization Alternative Studies. Modeling Lead for the analysis of WRD's Alamitos Barrier Pipeline system using five models developed for the project: a hydraulic model, a surge model, and a supply and demand water balance model of the barrier system, an updated hydraulic model of the connected LBWD recycled water system, and a model of the City of Cerritos recycled water system. WRD's Alamitos Barrier Pipeline supplies water to approximately 40 injection wells that serve as a seawater intrusion barrier. The water supplied includes both potable water from Metropolitan Water District and recycled water through LBWD's recycled water system. The District is planning on increasing recycled water production, and needed a hydraulic model and surge model of the barrier system to evaluate potential hydraulic impacts on the barrier wells, and identify improvements to address operational issues. The District also identified a potential new supply by conveying recycled water from the City of Cerritos system through the Long Beach Water System recycled water system; Chris led the development/update of hydraulic models for both systems to identify interconnection needs, operational strategies, and potential impacts on Cerritos and LBWD customers.

City of Antioch, CA – Collection System Master Plan. Project Engineer for a comprehensive capacity assessment of the City's sewer collection system that involved developing and calibrating the model, estimating existing flows using winter water demands and flow monitoring data, estimating future flows using land use planning information, and evaluating the system for potential hydraulic capacity deficiencies. Woodard & Curran used the results of the modeling to develop the City's Wastewater Collection System Master Plan.

City of San Mateo, CA – Flow Monitoring and Hydraulic Modeling Project, Modeling for Design of Basin 1, Basin 4 Improvements. Staff Engineer and Hydraulic Model Lead responsible for updating the dynamic hydraulic model of the City's sewer system, and subsequently to develop alternatives for capacity improvement projects in Basins 1 and 4. As part of the City's model calibration update, water use data and development/ redevelopment projections were used to estimate wastewater flows for existing and future conditions. The model was calibrated to flow monitoring data at over 45 locations in the system and the calibrated model was used to quantify flows through- out the system and identify critical capacity deficiencies. Chris used the updated model to develop a set of proposed capital projects, solutions to capacity deficiencies, and potential solutions to wet weather sanitary sewer overflows, which formed the basis of the collection system projects in the City's current Clean Water Program. Chris is currently supporting the design of improvements to address overflows in Basin 1 and Basin 4. As part of the Basin 4 improvements, Chris also helped develop an I/I reduction pilot program to assess the effectiveness of different I/I reduction methods for specific pilot areas.

City of Sacramento, CA – Sewer Master Plan for Basins G304/G305. Project Engineer leading the evaluation of sewer capacity for the G304/G305 sewer drainage basins, including hydraulic model development. Trunk sewer models were developed in both InfoSewer, the City' standard software for separate sewer system, and InfoWorks ICM in order to compare results. The models were calibrated to wet weather flow monitoring data from 13 sites and used to identify capacity improvement projects to serve existing and projected future development.

Gwinnett County, GA – Alcovy River Basin Sewer Model. QA/QC Reviewer for the development and calibration of a sanitary sewer model that will give Gwinnett County Department of Water Resources (GCDWR) the ability to accurately quantify remaining capacity in its sewer system under various wet weather scenarios and will also give the Department the ability to define the level of service it will provide to avoid sanitary sewer overflows (SSOs) during large storm events. Chris provided review support during development of the model network, dry weather loads, and calibration.

City of San Jose, CA – South Bay Water Recycling Strategic and Master Planning. As Project Engineer, identified vulnerabilities and developed solutions for the South Bay Water Recycling Program. The South Bay Water Recycling (SBWR) Strategic and Master Plan was developed as a partnership between the San Jose/Santa Clara Regional Wastewater Facility and the Santa Clara Valley Water District. The Strategic Plan identifies pathways to expand recycling through non-potable and potable reuse pathways and to appropriate funding and governance strategies and structures to support the evolution of the SBWR program from a wastewater management-driven to a water supply-driven initiative. As part of the Reliability Assessment portion of the project, Chris evaluated the distribution facilities and spoke with past and present operators to identify system vulnerabilities and develop potential solutions. Chris developed a list of distribution system related projects and activities for SBWR to bring the reliability of the program up to the Level of Service goals and the expectations of its customers.

Central Contra Costa Sanitary District, CA – Collection System Master Plan and Model Support Services. As Project Engineer, used the District's GIS to create a new, fully connected model network in InfoWorks, and extracted almost 300 mile of trunk sewer to be used as the basis of the District's new model. Chris and the Woodard & Curran team added pump stations and other structures, and underwent quality control and validation work to ensure that the modeled system is consistent with available record drawings and survey information. The project also includes updating all modeled loads using the District's billing data, and calibrating the model using 70 flow meters installed in the 2015/2016 wet season. Chris used the model to evaluate the capacity of the District's trunk system, identify any capacity deficiencies, and propose potential improvements. Chris has continued to support the District's modeling needs in a variety of ways, including staff training, development of best practices for updating the model to reflect changes in GIS, and other assorted model requests.

JENNIFER GLYNN, PE

QA/QC

Professional Profile

Jennifer has 24 years of a wide-range of experience in infrastructure design and construction, including pipeline condition assessment and pipeline rehabilitation. She is responsible for the condition assessment and design of over 120 miles of pipeline ranging in size from 2 inches to 108 inches in diameter. Jennifer has successfully managed projects from conception to completion, many of which required special attention to sensitive issues, including endangered species habitat preservation. She also has experience with design of pipelines within utility laden heavily trafficked corridors. Jennifer has been responsible for preparing plans and specifications; permitting; cost estimating; managing project budget and schedules; and coordinating and negotiating with state, local and federal agencies. She is a recognized expert in the field of trenchless technology and focuses on using the most advanced technologies in the field. Jennifer is especially proficient in the use of large diameter replacement and renovation systems. She served on the Executive Board of Directors for the North American Society for Trenchless Technology (NASTT) and is currently serving on the Board of Directors for the Western Regional Chapter of NASTT. Jennifer is also an NASTT course instructor for Pipe Bursting Good Practices as well as Introduction to Trenchless Rehabilitation.

Education

- Bachelors, Civil Engineering, University of New Hampshire

Registrations

- Professional Engineer – CA, 61303

Professional Associations

- North American Society for Trenchless Technology (National Board of Directors, 2010–2016)
- North American Society for Trenchless Technology (Western Regional Chapter Past Chairman of the Board of Directors)
- North American Society for Trenchless Technology (National Program Committee)
- Northern California Pipe User's Group (Past Vice Chair)
- American Water Works Association (National Water Pipeline Rehabilitation Standards Committee)
- North American Society for Trenchless Technology (National Pipe Bursting Course Instructor)
- North American Society for Trenchless Technology (National Introduction to Rehabilitation Course Instructor)

Related Experience

City of San Mateo, CA - Basin 1a Collection System Improvements. Project Manager managing the team developing a technical memorandum which included a detailed study of the evaluation criteria for each of the hydraulically verified projects and recommendations for future improvements, a preliminary design report, and final design documents. Bid support services and ESDC were also provided. Woodard & Curran's services included evaluating and designing several sewer rehabilitation projects for the City of San Mateo as part of the City's overall Clean Water Program. The overall project included six separate sewer projects comprising about 8,300 feet of new diversion pipelines and upsized relief pipes ranging from 15 to 27 inches. The alternatives analysis included a hydraulic modeling evaluation to verify the need for each of these projects as well as analysis of repair and rehabilitation alternatives.

City of San Mateo, CA – Sewer System Basin 4. Project Manager providing the City of San Mateo improvements to their San Mateo Sewer System Basin 4 collection system that will result in eliminating sanitary sewer overflows and unauthorized discharges. To address the Regional Board Cease and Desist Order, Woodard & Curran's work includes upgrading aging infrastructure, improving reliability, and providing capacity for wet weather flows. Basin 4 has a lot of historical overflows; work will consist of installing approximately 15,000 feet of new and upsized pipelines that are 10 to 24 inches, and rehabilitation and/or replacement of manholes and one pump station. The City's Master Plan identified nine different capacity projects and three large I/I reduction projects. The Woodard & Curran team will provide alternatives analysis, preliminary and final design, bidding support and construction services. During the conceptual phase, the team will conduct hydraulic analysis to determine appropriate pipe sizes and routing, as well as pipe installation and rehabilitation.

City of Santa Rosa, CA - Llano Trunk Lining, Utilities Field Office and West 3rd Street. Project Manager for the condition assessment, rehabilitation alternatives analysis, and design for 4,000 feet of the 48- through 54-inch sewer. The Llano Trunk Sewer is hydraulically impacted, conveying over 20 mgd peak dry weather flow. Challenges associated with this project included high sediment volume in the trunk sewer, schedule restrictions, and design of a major bypass system through a residential area and down a heavily trafficked roadway.

Napa Sanitation District, CA – Trunk Sewer Condition Assessment and Rehabilitation Project. Project Manager for the inspection and condition assessment of three miles of 66-inch RCP sewer interceptor for NapaSan.As part of the work, her team performed CCTV and sonar inspections, assessed CCTV footage and sonar data, and developed remaining useful life projections, project prioritization, and recommendations for repair. Jennifer is currently managing rehabilitation design of one mile of the 66-inch trunk sewer and overseeing CEQA and permit acquisition for the construction.

City of Santa Rosa, CA – Sewer Master Plan and Condition Assessment Project. Technical Lead for the inspection, condition assessment, remaining useful life predications, and project prioritization for 13 miles of trunk sewer ranging in sizes from 33 - 66” in diameter. Once the condition of the assets were determined and projects were identified, we leveraged our experience and industry knowledge to select appropriate rehabilitation solutions that balanced correctly addressing pipe condition, assuring constructability, minimizing permitting, and maximizing the use of the City’s available budget.

Sacramento Regional County Sanitation District, CA – Central Interceptor Large Diameter Sewer Pipe Condition Assessment. Technical Lead for the condition assessment of approximately ten miles of 84-inch to 108-inch calcareous reinforced concrete pipe (RCP). Project includes planning and oversight of extensive CCTV and man-entry physical inspections and development of recommendations for follow-up field testing and inspection for the remainder of the 47 miles system. This project also includes a rehabilitation alternatives analysis for 6 miles of the system that has been deemed in need of structural rehabilitation.

Union Sanitary District (USD), CA - Force Main Facility Condition Assessment Project. Project Manager developing a plan to identify and address short- and long-term maintenance needs, identify projects for repair or replacement, and develop financial planning criteria. As a part of their condition assessment program and following multiple joint failures that resulted in emergency repairs to the system, Woodard & Curran was contracted to perform a condition assessment of the force mains. This twin sewer force main system is comprised of approximately 27 miles of 33-inch and 39-inch Ameron Reinforced Concrete Pipe (RCP) installed in the late 1970s. This condition assessment has included an internal CCTV assessment, as well as destructive core sampling and testing of the pipe. Woodard &Curran reviewed the most applicable trenchless rehabilitation techniques, including their technical relevance, cost and schedule implications, and provided a final mitigation recommendation that would reduce the risk of future leaks at the force main joints while maintaining adequate hydraulic capacity.

Santa Ana Watershed Project Authority (SAWPA), CA - Inland Empire Brine Line Reach V Pipeline Condition Study. Project Manager for preparation of a condition assessment study of the Brine Line, including a capacity analysis and rehabilitation alternatives for appropriate repair and/or replacement methods. Woodard & Curran developed a condition study which included a risk and assessment and surge analysis of the 24-inch PVC brine line that failed in 2011 due to poor construction quality. The study defined the limits of needed repair work for the Reach V alignment and recommended appropriate rehabilitation and replacement methods for specific locations of highest risk along the alignment. Woodard & Curran recommended installation of 26 maintenance access structures, which included plug isolation valves and access tees for future bypass pumping to allow for cured-in-place pipeline rehabilitation. Approximately 12,900 feet of pressure CIPP will be installed in the near term and an additional 8,200 feet in the long-term. Air release valves were also recommended for replacement.

JUSTIN KRAETSCH, PE
SEWER LEAD

Professional Profile

Justin has five years of experience and provides services in water, wastewater, and recycled water infrastructure. He has experience providing project management, design, bid support, and construction support services for pump station and pipeline design, water/wastewater treatment design and plant retrofits, and pipeline rehabilitation.

Related Experience

City of Malibu, CA – Civic Center Wastewater Treatment Facility Phase 2. Project Engineer for the preliminary and final design of over 5 miles of 8-inch to 12-inch diameter gravity sewer, approximately 3,000 feet of 4-inch and 6-inch sewer force main, six sewer pump stations, over 5 miles of 4-inch to 8-inch diameter recycled water pipelines, and recycled water storage and pump facilities. Justin also assisted with the preliminary design of the Civic Center Wastewater Treatment Facility expansion to increase capacity to 0.5 MGD. Project work included preparation of three expansion evaluation reports, development of construction documents (plans and specifications), construction cost estimates, and construction schedules. Project challenges included shallow brackish groundwater, access issues due to its location within private communities with narrow roadways and minimal utility documentation, and coordinating with stakeholders and permitting agencies.

Education

- Bachelors, Environmental Engineering, California Polytechnic State University-San Luis Obispo
- Masters, Civil / Environmental Engineering, California Polytechnic State University-San Luis Obispo

Registrations

- Professional Engineer - CA, C 88445
- 10 Hour Construction Training - OSHA, 34-005681762

Professional Associations

- North American Society for Trenchless Technology, Member

Irvine Ranch Water District, CA - Sewer Siphon Improvements. Engineer responsible for designing improvements to four critical inverted sewer siphon facilities in IRWD's collection system. The preliminary design phase included hydraulic evaluation and condition assessment of the siphons, which ranged from 30 to 50+ years in service and had various degrees of blockages within the siphon barrels. Based on the deficiencies identified and the results of the hydraulic modeling, as well as input from District staff to enhance safety and reduce the O&M burden, the design encompassed approximately $6 million dollars of improvements to facilitate site access, siphon inlet/outlet structure top slab and maintenances access replacement, internal structural repairs, flow controls to passively distribute flow across each of the siphon barrels to improve self-cleaning, siphon barrel cleaning and cured-in-place pipe (CIPP) rehabilitation, odor mitigation through chemical dosing and air treatment vents, level monitoring, and addition of grit traps upstream of the siphons.

Santa Ana Watershed Project Authority (SAWPA), CA - Reach 4D Rehabilitation Work Plan. Project Engineer responsible for condition assessment on approximately seven miles of 42-inch reinforced concrete pipe (RCP) installed between 1990 and 1995, with T-Lock lining for 270 degrees around the inside diameter of the pipe, leaving 90 degrees unlined. Project included a CCTV assessment of the entire pipeline and man-entry physical inspections and concrete testing of both the manholes and pipeline at select locations entirely within one 24-hour period and at an accelerated schedule. Justin also assisted in estimating the useful remaining life of the pipeline and manholes based upon the condition assessment data, evaluate potential rehabilitation methods, and identify a preferred method. Data, information, and results were then summarized in a detailed Work Plan. This plan discussed the condition assessment findings, estimated useful remaining life of the pipeline and manholes, recommended rehabilitation method with suggested large volume bypass, and was accompanied by a project schedule, cost estimate, and required environmental documentation for the recommended method.

Napa Sanitation District, CA - 66-inch Trunk Sewer Condition Assessment and Rehabilitation Project. Project Engineer of the inspection and condition assessment of three miles of 66-inch RCP sewer interceptor. The assessment includes determining remaining useful life, developing recommendations for repair including project prioritization, complete a rehabilitation alternatives analysis, and completing preliminary and final design of the near-term recommended rehabilitation project involving the rehabilitation of approximately 7,000 feet of 66-inch RCP sewer interceptor by means of cured-in-place pipe lining.

City of Santa Rosa, CA - Llano Trunk Lining – Utilities Field Office and W 3rd Street. Project engineer for the design of the rehabilitation of 4,900 feet of 36-inch, 48-inch, and 54-inch reinforced concrete pipe trunk sewer by means of cured-in-place pipe lining. The project also includes rehabilitation of existing sanitary sewer manholes and bypass pumping of up to 20.3 MGD peak dry weather flow. Justin was responsible for the preparation of the final design plans, specifications, and engineer's preliminary cost estimate.

City of Yuba City, CA - Digester, Dewatering, and Electrical Facilities Improvement Project. Project Engineer responsible for the preparation of final design plans and specifications, calculations, and construction cost estimates for the addition of a 120-foot diameter secondary clarifier and 12 MGD bar screen. The City of Yuba City (City) contracted Woodard & Curran to provide final design services for the replacement of existing digester covers, upgrades to the dewatering system, the addition of a fourth secondary clarifier and third bar screen, and electrical upgrades throughout the City's Wastewater Treatment Facility. Justin was also responsible for the review of construction submittals and Request for Information responses during the construction phase.

City of Sacramento, CA - Accelerated Water Meter Program. Project Engineer for the preliminary design, final design, and development of plans and specifications for approximately 6,200 meter installations and 1.2 miles of water main replacement in Sacramento, CA. Preliminary design services included validating project maps, identifying water mains in need of replacement and designing the preliminary layout of replacement water mains. Justin led the preparation of the 50% and 90% design plans for the replacement water mains under the supervision of a registered PE.

El Dorado Irrigation District (EID), CA - Sly Park Intertie Improvements Project. As Project Engineer, drafted the Evaluation of Rehabilitation Alternatives Technical Memorandum for a 3.4-mile potable water pipeline owned by El Dorado Irrigation District near Placerville, CA. Justin was responsible for the research and selection of feasible pipeline rehabilitation technologies, evaluation of pipeline rehabilitation and open cut replacement alternatives, and the development of a capital cost estimate and 100-year net present value analysis for each alternative.

Orange County Sanitation District (OCSD), CA - District 6 Trunk Sewer Relief Project. Project Engineer responsible for the review of construction submittals, Request for Information responses, and review of record drawings. Orange County Sanitation District contracted Woodard & Curran to provide engineering services during construction for the rehabilitation of 3,500 lineal feet of trunk sewer using Cured-in-Place Pipe, pipe-bursting, and open-cut methods.

San Jose Water Company, CA - Franciscan Pump Station Improvements Project. Staff Engineer for the preparation of final design plans and specifications for a replacement pump station in San Jose, CA. Responsible was for site civil design for the construction of a new building to house the replacement pumps and the mechanical piping design. Completed the documentation for a conditional use permit application with the City of San Jose acting as the permitting agency.

San Jose Water Company, CA - Cambrian Station Improvements Project. Staff Engineer for the preparation of final design plans and specifications for a replacement pump station in San Jose, CA. Justin was also responsible was for site civil design for the construction of a new building to house the replacement pumps, the mechanical pump piping design, and the design of the relocated yard piping. Completed the documentation for a conditional use permit and erosion control permit application with the City of San Jose acting as the permitting agency.

KRAIG ERICKSON, PE
RECYCLED WATER LEAD

Professional Profile

Kraig has 18 years of experience and participates in all aspects of project implementation, from planning through design and construction services. He has provided design and construction management services for pipeline, pump station, treatment and reservoir projects for recycled water, potable water, storm drainage, and wastewater systems. His areas of specialty include recycled water conversions for irrigation and industrial customers, pipeline design, construction cost estimating, condition assessment inspections, and construction management for infrastructure projects. Kraig has also provided engineering and construction management for public works construction, public buildings, and public parks. He is experienced with condition assessment and rehabilitation projects for pipelines, reservoirs, pump stations and wastewater treatment facilities, as well as being a certified inspector for cured-in-place pipeline relining. Kraig has engineering experience with GIS, Auto-CAD, and hydraulic modeling software. He has been performing studies and providing engineering design services for various municipalities, government agencies, and private-sector clients throughout California since 2002.

Kraig leads Woodard & Curran's recycled water customer retrofit team. He has coordinated with State Division of Drinking Water and County Health Departments on numerous recent recycled water conversion projects for: Irvine Ranch Water District, Santa Fe Irrigation District, Los Angeles Department of Water and Power, Lathrop, North Marin Water District, San Francisco Public Utilities Commission, Camarillo, San Diego, and Pasadena. As part of the ongoing Recycled Water Customer Development and program management for City of San Clemente, West Basin Municipal Water District, and Yucaipa Valley Water District. Kraig has managed all customer conversions, developed recycled water conversion plans, worked directly with customers, coordinated with DDW/County, provided site inspections and developed conversion construction costs.

Education

- Masters, Industrial & Management Engineering, California Polytechnic State University-San Luis Obispo
- Bachelors, General Engineering, California Polytechnic State University-San Luis Obispo

Registrations

- CIPP Inspector - National Association of Sewer Service Companies (NASS, CIPP-810-0449
- Professional Engineer - CA, C73895

Professional Associations

- Orange County Water Association, Member
- WateReuse Association - Orange County Chapter, Secretary
- WateReuse Los Angeles Chapter
- WateReuse Orange County Chapter, Secretary

Related Experience

City of Malibu, CA - Wastewater Collection and Recycled Water Distribution System. Project Engineer for the recycled water dispersal/reuse system and provided preliminary design information and plans along with construction cost estimates. Currently in the design phase, Kraig is leading the pipeline design for both the collection and dispersal system. A key component of the system is the utilization of a dual trench for the HDPE wastewater collection system with the PVC recycled water distribution system. The collection system includes two large lift stations and dual-force-mains to deliver wastewater to the treatment plant. The recycled water system will carry tertiary treated effluent to both deep-groundwater injection wells and to irrigation customers in the City. Woodard & Curran is designing a wastewater collection system, 0.2-MGD wastewater treatment plant, and recycled water dispersal system for percolation as well as for reuse.

City of San Clemente, CA - Recycled Water Retrofits and Program Development. Project Manager responsible for meeting with customers, developing the design drawings, providing plan check for new developments, developing recycled water use training materials, and managing construction activities. Woodard & Curran is currently managing the conversion of 40+ public and private sites to recycled water use for irrigation in the City of San Clemente. Total irrigation demand to be converted to recycled water is 975 AFY for golf courses, parks, medians, schools, HOAs, and commercial irrigation. A key aspect of the project is the aggressive nine- month schedule to design and retrofit sites to coincide with the City's upgrades to the tertiary treatment system and make use of the available Metropolitan Water District recycled water retrofit rebate program.

City of Los Angeles Department of Water and Power (LADWP), CA - Recycled Water Use in Industrial Applications. Project Manager of the recycled water master plan for LADWP. Kraig developed a training seminar for DWP staff on recycled water uses for industrial applications. Industrial applications included cooling towers, boilers, textile industry (fabric dyeing, carpet dyeing, commercial laundry), car washes, manufacturing, and batch concrete.

City of Los Angeles Department of Water and Power (LADWP), CA - Non-Potable Reuse, Recycled Water Master Plan. Project Manager for customer site assessments for recycled water conversions, development of recycled water conversion plans, coordination with customers, and development of conversion construction costs. Customers include commercial central plants, cooling towers, carpet dyeing, fabric dyeing, cemeteries, college campuses, and golf courses. Woodard & Curran is developing the recycled water master plan for LADWP. Kraig is managing the customer development for all customer conversions.

City of Los Angeles Department of Water and Power (LADWP), CA - Maximizing Water Recycling, Recycled Water Master Plan. As Project Engineer, developed the LA River Flow Assessment Technical Memorandum to evaluate minimum flows into the LA River from water reclamation facilities. This report served as the foundation for assessing the maximum potential for recycled water to customers in the San Fernando Valley and Los Angeles County Metropolitan Transportation Authority (Metro) areas. Woodard & Curran is developing the recycled water master plan for LADWP.

City of Lancaster, CA - Recycled Water Facilities and Operations Master Plan. As Project Engineer, performed the market assessment, developed recycled water projects, performed hydraulic modeling of the system using H2OMAP-Water (including pipeline, storage and pump station sizing). Kraig also created cost estimates and coordinated with multiple agencies (including the City, SWRCB, LACSD, LA County Waterworks, State Department of Health Services, and LA County Department of Health Services) to develop a realistic implementation plan for the recycled water projects. This study's intent was to assist the City in creating a functioning recycled water program and establishing a citywide recycled water system throughout the growing City.

City of Oceanside, CA - Oceanside Recycled Water Facilities Plan. Project Manager leading efforts to perform outreach to target recycled water customers to verify non-potable demands. Using standard Woodard & Curran site survey forms, Kraig meets with the customers, discusses the City's overall recycled water program, reviews water quality with the customer, discusses rates, and performs detailed site walks. He then develops an Initial Customer Assessment Technical Memorandum for each customer that refines the projected non-potable demands, pressure requirements, and a capital construction cost for the conversion to recycled water. Woodard & Curran is currently working with the City of Oceanside to evaluate several water recycling strategies and develop a capital improvement program (CIP). The goal of this Plan is to assist the City in creating a functioning recycled water program and establishing a citywide recycled water system. The CIP will identify a phased approach as well as ultimate build-out projects for implementing recycled water facilities within the City's service area. The recycled water projects are identified by analyzing the recycled water system under future demand conditions, and the CIP will include a list of recommended projects, proposed phasing of the projects, and planning-level estimates of probable construction costs, providing a road map for the City in recycled water system planning for the future

City of Hayward, CA - Recycled Water Facilities Plan. As Project Engineer, prepared the design criteria and sized the treatment facility expansion. Kraig developed the facility layout in Auto-CAD and developed construction cost estimates. Woodard & Curran is creating a functioning recycled water program and establishing a citywide recycled water system throughout the City and to serve the future Calpine power plant. The facilities plan includes a planning-level design of the expansion of Hayward's treatment plant to tertiary-level water quality.

KYLE CORBEIL, PE
WATER SYSTEM MODELING

Professional Profile

Kyle is a Technical Manager with 17 years of experience in water and wastewater treatment, water distribution system design and evaluation, geographic information systems (GIS), and site-civil engineering for municipal and industrial clients. He performs evaluation and design work for wastewater and water treatment systems, treatment system upgrades, process and instrumentation design, hydraulic distribution system modeling, life cycle cost analysis, capital improvement planning, and various aspects of site-civil design. He also prepares specifications, bid documents, and cost estimates, provides construction administration and oversight, and technical assistance for a variety of drinking water treatment and distribution applications.

Education
- Bachelors, Civil & Environmental Engineering, University of Maine

Registrations
- Professional Engineer - MA, 56329
- Professional Engineer - ME, 12128
- Water Operator Grade 4T - ME, 30906

Professional Associations
- American Society of Civil Engineers, Member
- American Water Works Association, Member

Related Experience

Bangor Water District, Bangor, ME – Ozone Upgrade Project. Technical Manager responsible for the design of an SRF-funded major upgrade to the unfiltered source Butler WTP ozone disinfection system, including process evaluation, equipment procurement, and design document preparation. This project consists of the conversion of a 13 MGD capacity air-fed low-concentration ozone disinfection process with fine-pore diffusion to a sidestream liquid oxygen fed high concentration ozone process, including ozone generation equipment, sidestream pumping and ozone diffusion, liquid oxygen storage and feed equipment, instrumentation, and other WTP improvements.

City of O'Fallon, MO – Water Master Plan. Project Engineer supporting a complete evaluation of the City's water supply, treatment, and distribution system. Responsible for constructing, calibrating, and use of an Innovyze Infowater software hydraulic system model to identify improvement areas, pipe rehabilitation requirements, and produce a pipe replacement schedule and cost estimate. Also responsible for evaluating the 4.5 MGD groundwater treatment plant for current condition and future capacity and producing a capital improvement plan with cost estimates and schedule.

Tariffville Fire Department, Tariffville, CT – Water System Planning and Infrastructure Improvements. Engineer providing support in water system consulting services to the District, including the design and implementation of water system upgrades, a new SCADA system, distribution system improvements, and well diversion permitting.

North Tiverton Fire District, North Tiverton, RI – Hydraulic Model and Distribution System Design Support. Engineer providing hydraulic modeling support using Innovyze Infowater software for the evaluation of the District's water distribution system capacity regarding development projects and distribution system rehabilitation.

Westchester Joint Water Works, Westchester, NY – Hydraulic Modeling. Engineer responsible for creating a GIS-based hydraulic distribution system model using Innovyze Infowater for the utility serving New York's Village of Mamaroneck, Town of Mamaroneck, Town and Village of Harrison, and Village of Larchmont. This system serves a population of over 55,000 and has an average daily flow of over 12 MGD. The model was used for a system-specific study for compliance with the EPA Stage 2 Disinfectants and Disinfection By-Products Rule. It is also being used for evaluating planned system improvements.

City of Worcester, MA – Ozone Upgrade Project. Technical Manager responsible for the design of a major upgrade to the existing ozone pre-oxidation and disinfection system at the City's 50 MGD capacity WTP, including process evaluation, equipment procurement, and design document preparation. This project consists of the conversion of an air-fed low-concentration ozone generation to an oxygen-fed high concentration ozone process.

Town of Billerica, MA – Capital Improvement Plan. Project Engineer supporting a Capital Improvement Plan, including an evaluation of the 14 MGD capacity surface water treatment plant and distribution system. Provided support for the construction, calibration, and using an Innovyze Infowater software hydraulic model to identify and prioritize distribution improvements as well as evaluating the treatment processes and facility condition for a comprehensive CIP.

City of Brewer, ME – Hydraulic Modeling. Engineer responsible for creating an Innovyze Infowater GIS-based hydraulic system model for the purpose of evaluating existing system conditions, potential impacts from planned maintenance activities, and several mutual aid scenarios with the neighboring water district.

City of Brewer, ME – WTP UV Upgrade. Project Engineer supporting the upgrade design for a 2.8 MGD unfiltered source drinking water treatment plant upgrade including the addition of UV disinfection for EPA LT2 compliance and upgrades to the ozone process.

Candlewood Trails Association, New Milford, CT – Water System Improvements. Engineer providing support to water system consulting services including new well development, design of a new pumping and standby treatment system, funding assistance, a system operation evaluation, a distribution system evaluation using Innovyze Infowater software and recommendations for improvements.

Bangor Water District, Bangor, ME – Water Treatment and Distribution Evaluations. Project Engineer responsible for evaluating distribution system hydraulics and water quality for a system serving more than 45,000 people and 5 MGD average daily flow. We have provided multiple evaluations of their existing chemical feed system and recommendations to comply with EPA Lead and Copper Rule requirements as well as evaluations of existing storage and distribution and recommendations for improvement. Hydraulic modeling was used extensively for these evaluations.

Town of Bar Harbor, ME, Water Division – WTP Upgrade and Distribution System Evaluation. Project Engineer responsible for the design of an SRF-funded major upgrade that included pumping equipment replacement, UV disinfection, chemical system upgrades, chemical conversions, analytical modifications, piping and equipment modifications, and SCADA upgrade for compliance with the EPA Lead and Copper Rule and EPA LT2 requirements. Also provide distribution system hydraulic modeling analysis for water storage evaluations, development impacts, and operational modifications.

City of Lawrence, MA – Marston Street Pump Station. Technical Manager responsible for the design of a new 2.9 MGD municipal drinking water booster pump station to replace an existing pump station in the City of Lawrence. The existing pump station is located on a constrained site, is the sole supply to the pressure zone, and must be replaced with no interruption of water service to customers. The design included a modular precast concrete building, pump system replacement, new electrical and SCADA systems including an on-site generator for backup power, and site improvements to increase usability of the site and safety of the operators. The project is SRF-funded.

Town of Cumberland, RI – Girard Road Booster Pump Station. Project Engineer responsible for the design of the rehabilitation of the existing Girard Road Booster Pump Station, increasing its capacity to 2.5 MGD to support groundwater well improvements. The design included pump system replacement, new electrical and SCADA systems, upgraded chemical feed and analytical instrumentation equipment, and other building and site improvements to increase usability of the site and safety of the operators.

Town of Northport, ME – Collections System Review. Engineer responsible for evaluating and reporting on the small, coastal community's wastewater collection system and proposing treatment upgrade options.

MATTHEW ELSNER, PE

QA/QC

Professional Profile

Matt has over 27 years of experience with recycled water, water quality, and water conservation projects. Prior to joining Woodard & Curran, Matt was a principal civil engineer with a major public utility in Southern California and a civil engineer with a public water utility in southern Arizona. He has served as editor of the WateReuse Association Los Angeles section newsletter since its inception in 2010.

Education

- Masters, Civil Engineering, Drexel University
- Masters, Environmental Engineering, Drexel University
- Bachelors, Civil Engineering, Drexel University

Registrations

- Professional Engineer - AZ, 57683
- Professional Engineer - CA, 73432

Related Experience

Coachella Valley Water District, CA - Galindo Area Corrosion Study. Project Manager responsible for performing a corrosion investigation of existing ductile iron pipe water mains in the Galindo service area of CVWD. DIP water mains in the Galindo service area had experienced corrosion-related failures within ten years of installation. The investigation included recommendations to resolve the corrosion issues and prevent their reoccurrence.

Santa Clarita Valley Water Agency (SCVWA), CA - South End (Phase 2C) Recycled Water Main Extension. Senior Technical Manager responsible for the data collection, utility research, hydraulic evaluation, corrosion evaluation, final design, and construction cost estimating. This project involves preparing final design and construction documents for the South End Recycled Water Main (6 miles of up to 24" pipe). Project elements include a Caltrans crossing of the I-5 at Valencia Boulevard, a LA County Flood Control District crossing of the Santa Clara River at Orchard Village Road, hydraulic evaluation of an existing booster station, and design of a new booster station for a closed zone.

Santa Clarita Valley Water Agency (SCVWA), CA - West Ranch (Phase 2D) Recycled Water Main Extension. Senior Technical Manager for the final design and construction cost estimating. This project involves preparing final design and construction documents for the West Ranch Recycled Water Main (1 mile of 12" pipe). Project elements include a new booster station for a closed zone and construction adjacent to several schools.

City of Paso Robles, CA - Paso Robles Recycled Water Distribution System. Senior Technical Manager responsible for data collection, utility research, alignment evaluation, construction cost estimating, and storage evaluation. This project involves preparing preliminary design documents for the City's Phase 1 Recycled Water System (8 miles of up to 24" pipe and a Salinas River crossing) along with a recharge investigation.

Rowland Water District, CA - Phase 3 Construction Support for Fullerton Road Grade Separation. Senior Technical Manager developing design drawings, redesigning pipe alignments to avoid obstacles, and preparing a State of California Water Resources Control Board Division of Drinking Water waiver request for recycled water pipelines which will not meet minimum separation requirements. Woodard & Curran is providing design and construction support services for Phase 3 of the Fullerton Grade Separation Project: Relocation of potable water and recycled water facilities.

Goleta Water District, CA - Goleta Potable Reuse Facilities Plan. Senior Technical Manager providing potable reuse pathways screening tasks including reports, cost estimates, and technical reviews. Woodard & Curran is working with Goleta Water District and Goleta Sanitary District to improve local water resources reliability by developing an underutilized local supply through advanced water purification and potable reuse. Woodard & Curran developed a comprehensive plan to maximize beneficial use of recycled water as a potable water supply supplement to meet future demands and reduced surface water supply reliability.

Santa Clarita Valley Water Agency (SCVWA), CA - Erosion Evaluation and Repair Alternative Analysis. Project Manager of CLWA's Rio Vista Water Treatment Plant Upper Mesa Erosion Evaluation and Stabilization Alternatives Analysis project. The project included estimating stormwater runoff volumes and rates, identifying where repairs or improvements are justified, and providing solid alternatives and engineer's estimates for the cost of those improvements.

Arvin Edison Water Storage District, CA - Recycled Water Feasibility Study. As Senior Technical Manager, reviewed the recycled water supply; evaluation of water quality impacts and funding sources; assessment of water quality impacts; and preparation of planning grant application The study included review and evaluation of the Arvin Edison Water Storage District's recycled water supplies; development of design criteria for required treatment, pump stations, storage facilities, land/easements, and any other key infrastructure for a project; and development of an implementation plan.

Burbank Water and Power, CA – Potable Reuse Feasibility Study. Primary technical resource for a Feasibility Study that developed a conceptual potable reuse project that uses available effluent from the Burbank Water Reclamation Plant. The study analyzed siting options for an advanced treatment facility, identified potential receptors for various types of purified recycled water, and specified infrastructure needed to deliver the purified water. Both indirect potable reuse and direct potable reuse alternatives were considered. Cost estimates were included to support the recommendation of a preferred alternative, and comparisons to projected MWD rates were developed to demonstrate the long-term financial feasibility of a potable reuse project. The project was partially funded by a planning grant from the Water Recycling Funding Program administered by the State Water Resources Control Board, and the report was formatted to meet the requirements of that program.

Burbank Water and Power, CA. Principal Civil Engineer responsible for recycled water, water quality, and water conservation at a publicly-owned utility. Effectively supervised professional staff including engineers and water quality personnel. Presented reports to the Burbank City Council and the utility's governing board relating to water quality, recycled water, and contract awards. Represented the utility at various meetings related to water supply, water quality, conservation, and recycled water. Consulted with system operations and construction/maintenance personnel to optimize water system operations and ensure compliance with regulatory requirements. Lead the CIP and O&M budget process for the recycled water cost center including the evaluation and update of water rates and fees. Managed the accelerated design and construction of a $20 million expansion of Burbank's recycled water system. Prepared and negotiated MOUs and contracts with neighboring utilities and water suppliers. Evaluated water quality data for compliance with state and federal regulations. Provided technical support with the newest, up-to-date water conservation initiatives. Oversaw major water planning studies including Recycled Water Master Plans and Urban Water Management Plans.

City of Tucson, CA - Environmental Services Department. Project Manager responsible for the Planned Area Development of the Los Reales Landfill including the construction of new entrance facilities, residential waste transfer station, household hazardous waste receiving facility, administration building, learning center, and public roadway relocation. Led the selection process for on-call design consultants for various projects at the landfill. Designed various projects such as drainage structures, litter management facilities, landfill gas system upgrades, and site security modifications. Managed environmental remediation projects related to leaking underground storage tank clean-ups, municipal landfills site closures, and groundwater contamination. Oversaw and evaluated the operation of site remediation systems including compliance with air quality, groundwater quality, and NPDES permits. Ensured project compliance with the City's CIP process including project charter development, budget preparation, expenditure tracking, and future cost predictions.

Tucson Water Department, AZ. Civil Engineer responsible for the design and management of projects relating to potable and reclaimed water transmission and distribution facilities. Managed consultants and in-house staff during the planning and design of water transmission and distribution projects. Oversaw specialty consultants during the design phase including surveying, surface water hydrology, archaeological, endangered species, and corrosion evaluation. Served as project engineer during the construction of water transmission projects including the monitoring of construction progress.

SAMANTHA WEIDENBENNER, PE

SEWER MODELING

Professional Profile

Samantha has nine years of experience in wastewater and stormwater system planning, modeling, and design. She has extensive experience in modeling and analyzing wastewater collections systems. Samantha's experience includes sizing storage tunnels and plan preparation for the separation of combined sewer systems into sanitary and stormwater systems. Recently, her work has focused on construction administration and feasibility designs for funding. Samantha has also managed emergency response plan creation, mapped wastewater district customer complaints, sized air valves, developed pedestrian trail signage, and designed ADA compliant accessible ramps. She has managed projects primarily in the greater St. Louis region and Illinois.

Related Experience

City of Troy, MO – Municipal Separate Storm Sewer System (MS4) Compliance. Project Engineer responsible for coordinating the development of the Stormwater Management Plan for the City of Troy. Notice of violation was resolved with first submission of SWMP to Missouri Department of Natural Resources.

Town of Norwalk, CT – Flood Mitigation Stormwater Modeling. Project Engineer who reviewed survey data and updated XPSWMM 2D model.

Public Water Supply District No. 2 of St. Charles County, MO – Armory Tank Relocation Study. Project Engineer responsible for data gathering, pump hydraulic calculations, and on time submittals for tank relocation feasibility report.

City of Quincy, WA – Disinfection System Feasibility Study. Project Engineer responsible for developing conceptual design, costs, site layout, process flow diagrams, and evaluating alternatives for replacing the existing UV disinfection system at the Quincy Municipal Water Reclamation Facility.

Village of Greenview, IL – Wastewater Treatment Facility Design. Project Engineer responsible for designing the new wastewater treatment facility for the Village of Greenview, a previously un-sewered community. Applied for and received permits through the Illinois EPA and US Army Corps of Engineers. Assisted project manager with funding coordination with US Department of Agriculture.

City of Quincy, WA – West Canal Intake Design. Project Engineer responsible for coordinating concrete structural design with regulatory and hydraulic limitations on intake structure. Coordinated construction administration on a tight deadline with high urgency.

City of St. Charles, MO – Local Limits Study. Project Engineer responsible for completing survey of all potential industrial dischargers, calculations related to local limits imposed on dischargers, and coordinating with plant staff to gather sampling data.

Education

- Masters, Environmental Engineering, Missouri University of Science and Technology
- Bachelors, Environmental Engineering, Missouri University of Science and Technology

Registrations

- Professional Engineer - MO, 2016017694

Professional Associations

- Missouri Water Environment Association, Chair
- Missouri Water Environment Association, Board Member

Technical Expertise

- Collection and Conveyance Systems
- XPSWMM Modeling
- ArcGIS Mapping and Analysis

City of Hillsboro, IL – Preliminary Engineering Report for USDA Funding. Project Engineer responsible for existing conditions component of report, as well as figures and background information.

City of Monmouth, IL – West 11th Avenue Utility Expansion. Project Engineer responsible for finalizing plan set and specifications for drinking water and sanitary sewer utility expansion.

City of Monmouth, IL – Community Development Block Grant Watermain Replacement. Project Engineer responsible for development of plan set and specifications for replacement of 1,700 feet 8-inch watermain with 10-inch watermain.

City of Monmouth, IL – Smithfield Lift Station and North Plant WWTF Upgrades. Project Engineer responsible for coordinating sub-disciplines including electrical, instrumentation, structural, architectural, HVAC, and civil/water resources. Designed lift station sizing and site layout. Managed project through design, bidding, and construction administration.

City of Monmouth, IL – CSO Long Term Control Plan Phase 2: Lagoon Dewatering Pump Station and Force Main. Project Engineer responsible for performing pump station sizing calculations and force main alignment. Also evaluated many methods to reduce grit accumulation in the pump station and designed the final layout.

City of Monmouth, IL – TIF Drainage Study. Project Engineer responsible for performing desktop study and site visit for the undeveloped project site commonly known for regular flooding. Delineated drainage area and gathered other essential information to run hydrologic analysis on the site. Hydrologic analysis confirmed that chronic flooding was occurring. Drainage study and letter sent to City Officials to be used as part of the Tax Increment Financing (TIF) development.

The following projects were completed prior to joining Woodard & Curran.

City of St. Louis, MO – Project Connect Northside Urban Renewal. Project Engineer responsible for merging three XPSWMM models into one PCSWMM model for analysis of the collection system's level of service. Developed maps indicating level of service results for the modeled collection systems. Project included working as a sub-consultant with City Planners to ensure the city infrastructure, including the collection system, was prepared to encourage economic growth in the region.

Metropolitan St. Louis Sewer District, MO – Sewer Separations within Deer Creek Watershed. Several combined sewer system areas were determined to be more cost effective to separate rather than convey the overflow to storage. Review of conceptual plans, preliminary engineering plan preparation, modeling, and cost estimates were included for the following projects.

- **CSOs L-122, L-126, L-127.** Project Engineer responsible for the pre-design plan preparation, model, and cost estimate for three combined sewer areas to be separated within the Deer Creek Watershed. Each area had between 700 and 1100 LF of proposed sewer piping.

- **CSO L-106 (Brentwood) Sewer Separation**. Project Engineer who worked to create the preliminary engineering alignment for both storm and sanitary sewers, frequently using existing sewers in place to reduce construction cost. The storm and sanitary hydraulic models were created to validate the use of the existing sewers. The storm model was created in HydraFlow. The sanitary model was expanded and modified from the existing MSD XPSWMM model of the watershed, previously converted by Samantha.

Metropolitan St. Louis Sewer District, MO – Force Main Emergency Response Plans. Project Manager responsible for ensuring the timely delivery and accuracy of emergency response plans for force main or pump station failure at 51 pump stations located within the Metropolitan St. Louis Sewer District.

Metropolitan St. Louis Sewer District, MO – Cityshed A SPA Mapping. Project Engineer responsible for coordinating data and mapping sewer system customer complaints from different categories into regional and local suspected problem area (SPA) maps.

TODD PROKOP, PE
WATER LEAD

Professional Profile

Todd has over 12 years of experience in drinking water distribution system and treatment process design for clients in the municipal and private sectors. Projects include the development of distribution system upgrades, pump stations, chemical feed stations, and chemical comparisons. Todd has developed a comprehensive knowledge of water distribution system engineering.

Related Experience

City of Lowell, MA – Phase 1 Transmission Main Extension. Technical lead for the design, bid and award and construction administration of approximately 650 linear feet of new 6-inch through 30-inch cement lined, ductile iron water main with an approximate construction cost of $1,200,000. The project allowed Lowell to make key improvements to its transmission mains in before MassDOT completed work, saving money on final paving and avoiding a potential work moratorium. The project adds important redundancy to the water system and was designed to prepare for future planned projects.

Education

- Masters, Environmental Engineering, Worcester Polytechnic Institute
- Bachelors, Civil Engineering, Worcester Polytechnic Institute

Registrations

- Professional Engineer - MA, 49898

Professional Associations

- American Water Works Association (AWWA), Member
- New England Water Works Association (NEWWA), Member

City of Lowell, MA – High Pressure Water Main Replacement. Engineer responsible for design and permitting of the emergency replacement of a high-pressure transmission main crossing the Merrimack River. The project included the installation of 600 feet of new HDPE water main under the Merrimack River to supply water to a high-pressure zone. The project involved an emergency Notice of Intent filing to allow excavation work within the Merrimack River, and was awarded under a DCAMM emergency bid waiver.

Town of Andover, MA – High Street Area Water Main Improvements Project. Project manager and technical lead responsible for overseeing design and permitting of a 6,000 foot water main replacement project. The project included the replacement of existing water mains within several wetland resource areas, including water main passing directly through vegetated wetlands and under an intermittent stream.

City of Lawrence, MA - South Lawrence Water Main. Project manager and technical lead for the design, bidding, and on-going construction administration services for an estimated $2,700,000 in water main replacement. The design includes construction of approximately 6,150 linear feet in new 20-inch through 6-inchinch cement lined, ductile iron water main, 12,000 linear feet in 2- and 6-inch temporary bypass water main. A portion of the designed work will occur within riverfront and bordering wetlands buffer zones.

City of Lawrence, MA - South Lawrence Valve Replacement. Project manager and technical lead for the design, biding, and on-going construction administration of an on-call valve replacement project. With a value of $1,600,000, the project scope includes approximately 120 4- through 12-inch water main gate valve replacements over a year period. This project supports the South Lawrence Valve Assessment, led by Woodard & Curran, to replace valves identified as needing replacement during or as a direct result of valve turning during the assessment.

Town of Cumberland, RI – Diamond Hill Road Water Main Replacement. Project Manager for the design, bidding and construction observation for approximately 13,000 linear feet of 6-inch through 12-inch diameter water main in Diamond Hill Road. This fast-track design project was completed in less than four months to take advantage of paving scheduled to be funded by the State. Executing the design rapidly saved the Town significant dollars on surface restoration while simultaneously addressing water distribution system deficiencies. When the Department of Transportation's plan for a nearby rotary project changed, Woodard & Curran adapted quickly and performed additional design services to fully leverage the DOT's work and minimize the cost to Cumberland's rate payers.

Dracut Water Supply District, Dracut, MA – 2016 Undersized Water Main Replacement, Phases 1-3. Engineer completing design, permitting, bidding, and construction oversight of project to install a total of 4,500 linear feet of ductile iron water main replacement as part of three separate projects. Project design included site survey, subsurface exploration, and wetlands permitting. Responsibilities also included bidding and award of project on behalf of the District, and construction oversight during installation.

Dracut Water Supply District, Dracut, MA – State Forest Booster Pump Station Discharge Main Upgrades. Engineer completing design, permitting, and bidding, and construction oversight of project to install a total of 1,075 linear feet of 6-inch through 24-inch ductile iron water main replacement to reduce system losses in the area of the State Forest Booster Pump Station. Project design included site survey, subsurface exploration, and wetlands permitting, and also included complex phasing and bypass requirements necessary to ensure that the District maintained operation of a critical pump station throughout the construction period. Responsibilities also included bidding and award of project on behalf of the District.

City of Lawrence, MA – Water Main Replacement Project. Engineer responsible for design, permitting, bidding, and construction oversight of 7.5 miles of 6-inch through 24-inch water main replacement and rehabilitation in a dense, urban environment funded by the Massachusetts DWSRF program. The project included working with the Department of Public Works and public safety officials to prioritize project work based on available funding, and completing replacement design, including site survey and subsurface exploration. The project also included construction oversight and updates to design required by unexpected subsurface conditions.

City of Lawrence, MA – Distribution System Improvements. Project included design, bidding and construction oversight of cleaning and lining of 2,750 feet of 8-inch and 6-inch cast iron water main, replacement of 1,500 feet of ductile iron water main, and isolation and replacement of approximately 50 failed or leaking valves throughout the City's distribution system.

City of Boston, MA – Emergency Water Supply to Long Island, Boston Harbor. Engineer responsible for the alternatives analysis, design, and implementation of an emergency plan to supply the City's facilities on Long Island with potable water for six months. The project involved MassDEP permitting, temporary distribution systems on both the mainland and island, temporary pumps, permanent improvements to the island's distribution system, and delivery of potable water using a barge-mounted tank and pump. Over 1,000,000 gallons of water was delivered as part of the project during the 2015 summer season, and weekly sampling was completed to demonstrate water quality.

City of Lowell, MA – Humphrey Street Water Main Replacement Project. Engineer completing design, permitting, and bidding of project to install 5,000 linear feet of ductile iron water main on Humphrey and Aberdeen Streets in Lowell. Project design included site survey, and wetlands permitting. Responsibilities also included bidding and award of project on behalf of the City.

City of Lowell, MA – Redundant Transmission Main Project. Engineer completing design, permitting, bidding, and construction oversight of project to install 7,000 linear feet of ductile iron water main, including 1,000 feet of 36-inch main and 1,600 feet of 24-inch main. Project design included site survey, wetlands permitting, MassDOT permitting, and project phasing due to work near the Lowell Regional Water Utility treatment plant. Responsibilities also included bidding and award of project on behalf of the City, and project oversight during the construction phase.

Town of Shirley, MA - Walker Well Chemical Feed Facility. Engineer assisting with the design of a new 0.65 MGD water supply well in Shirley, MA, including building, well pump, chemical feed system, SCADA system, and water main connection. Assisted with the preparation of technical specifications and drawings.

Brian Briones, PE

Role: Project Manager

Education
B.S., Civil and Environmental Engineering, San Diego State University, 2002

Registration
Civil Engineer, CA (C68474)

Joined V&A
2016

Total Years of Experience
19 years

Training, Certifications and Memberships

- Association of Materials Protection and Performance (AMPP) (formerly NACE and SSPC) Cathodic Protection Technician - CP2 #71075
- AMPP Member
- National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification (PACP) U-216-07002781
- National Association of Sewer Service Companies (NASSCO) Manhole Assessment Certification (MACP) U-216-07002781
- National Association of Sewer Service Companies (NASSCO) Lateral Assessment Certification (LACP) U-216-07002781
- Confined Space Entry Certified
- Basic CPR/First Aid

Publications
"Condition Assessment Methods for Lock-bar Steel Pipe", ASCE Pipelines Conference 2015

Professional Summary

Brian is licensed as a civil engineer with more than 19 years of experience working in condition assessment and design of water and wastewater facilities including cathodic protection systems. He has completed projects throughout Southern California including planning, design, and condition assessments of large-diameter pipelines, pump stations, water treatment, water storage, and pressure control/hydroelectric facilities.

Relevant Experience

Casitas Municipal Water District Rincon Pipeline Condition Assessment. Ventura County, CA
V&A performed a condition assessment of the high-pressure portion of the Rincon Pipeline, owned by the Casitas Municipal Water District. V&A recommended locations to excavate the pipe and performed onsite assessment and testing of the potable water pipeline. Testing included visual a qualitative investigation with photo documentation, soil sample analysis of pipe bedding and native soil, concrete sampling and testing of the cement mortar coating at four locations around the perimeter of each excavated pipe, and ultrasonic thickness testing of the steel.

IRWD Turtle Ridge Pipelines Corrosion Survey and Cathodic Protection Design. Irvine, CA
V&A performed condition assessment, corrosion survey and detailed design of a new impressed current cathodic protection (CP) system for an existing domestic waterline (DW) and reclaimed waterline (RW) installed along Turtle Ridge Drive in Irvine, CA. The DW consists of 1,780 feet of 16-inch ductile iron pipe (DIP) and the RW consists of 1,870 feet of 10-inch DIP. Both pipelines have short spans of cement mortar lined and coated (CML&C) that had experienced leaks due to corrosion. The condition assessment included excavating the pipelines and performing visual assessment and broadband electromagnetic testing to determine the remaining pipe wall thickness of the pipe. The corrosion survey included soil resistivity testing, current requirement testing, electrical isolation testing, electrical continuity testing, and potholing to identify the recommended CP system to mitigate external corrosion of the project pipelines. V&A completed detailed design of a new impressed current CP system.

SAWPA Inland Empire Brine Line Reach 4D Condition Assessment. Chino, CA
V&A performed a condition assessment of approximately 36,000 linear feet of 42-inch brine pipeline owned and operated by Santa Ana Watershed Project Authority (SAWPA) in Chino, CA. The brine pipeline is reinforced concrete pipe (RCP) with a T-Lock lining at the upper 270 degrees of the pipe. The lower 90 degrees is unlined. Low flows during the initial years of operation caused corrosion of the unprotected

invert, resulting in a loss of concrete and uplifting of the T-Lock liner. V&A was retained by Woodard & Curran to perform a condition assessment of the pipeline. V&A planned and conducted closed-circuit television (CCTV) of approximately 14,000 linear feet of the pipeline and five confined space entries during a 24-hour shutdown of the pipeline. Confined space entries at the manholes focused on visual assessment of the manhole, condition of the RCP behind the T-Lock lining, and condition of the unlined RCP and uplifting of T-Lock lining at the termination. The T-Lock lining was removed at two locations (crown and spring line of the pipe) for RCP assessments and was repaired after testing was completed.

Orange County Sanitation District P15-02 Edinger Pump Station Condition Assessment. Huntington Beach, CA

V&A performed condition assessment of the Edinger Pump Station to support the Orange County Sanitation District (OCSD) for the Edinger Pump Station Rehabilitation Study in Huntington Beach, CA. The pump station consists of two separate reinforced concrete structures, a circular wet well and a rectangular dry well. It is located beneath the travel way of Edinger Avenue near the intersection of Graham Street. The purpose of the condition assessment was to provide an opinion of the physical condition and determine remaining service life. Condition assessment methods included visual assessment, concrete surface testing, surface penetrating radar, half-cell potential, galvanostatic pulse testing, and concrete core samples and laboratory testing.

EVMWD Skymeadows Booster Pump Station Condition Assessment. Lake Elsinore, CA

V&A conducted a condition assessment of approximately 3,700 linear feet of 6-inch cement mortar lined and coated, welded steel pipe owned and operated by the Elsinore Valley Municipal Water District. The condition assessment focused on the length of potable water pipeline with the most elevation rise, from the Skymeadows Pump Station to the air valve vault. V&A retained a contractor to perform three excavations, conducted broadband electromagnetic (BEM) scanning to determine apparent pipe wall thickness, gathered soil samples for laboratory corrosivity testing, performed a visual assessment of the exposed pipe segment and site conditions, and conducted hydraulic testing. Condition assessment results indicated the pipeline is in good condition.

Irvine Ranch Water District Newport Coast Lift Station and Force Main Assessment and Rehabilitation Design. Newport Beach, CA

V&A performed a confined space entry condition assessment of the lift station wet well and a video assessment of the 12-inch diameter, 3,000-foot long force main at the IRWD Newport Coast Lift Station. The condition assessment also included an assessment of a concrete wet well, which consisted of visual observations, depth to reinforcing steel measurements on the concrete walls, and penetrations to sound concrete, and pH measurements. The assessment of the force main was performed with CCTV and the video was reviewed and scored per NASSCO PACP standard rating guidelines. V&A prepared the technical specifications for the new lining in the wet well, new manholes with force main inspection ports, and a Cured-In-Place-Pipe lining for the force main. Construction was completed in 2018.

City of San Diego, Condition Assessment of Three Water Transmission Pipelines. San Diego, CA*

Served as the engineering manager for the condition assessment of three water transmission pipelines. Pipelines included 30,000 LF of a 48-inch welded steel raw water pipeline with asbestos felt wrap coating; 35,000 LF of 36-inch lock-bar steel potable water pipeline with coal tar enamel coating; 14,000 LF of 36-inch steel cylinder, rod wrapped potable water pipeline with concrete coating; and 28,000 LF of welded steel potable water pipeline with cement mortar coating. Brian led field inspection activities including selection of technologies, coordination of flow adjustments, internal video, valve assessments, selection of excavation locations, non-destructive testing, laboratory analysis of concrete mortar samples, and installation of CP test stations and corrosion rate probes. He also provided valuable input into the risk analysis for all pipeline segments and wrote the field inspection results report and engineering evaluations which included rehabilitation/replacement recommendations.

Kevin Krajewski, PE

Role: Senior Project Manager

Education
B.S., Mechanical Engineering,
University of California – Davis, 1995

Registration
Mechanical Engineer, CA (M31744)

Joined V&A
1996

Total Years of Experience
27 years

Training and Certifications
- Asbestos Awareness
- Confined Space Entry-Certified
- Basic CPR/First Aid

Publications
- "You Can't Squeeze Wine from a Stone: The Success of Napa Sanitation District's I&I Reduction Program," WEFTEC Annual Conference, 2017 (Damron A., Winkelman M)
- "Collection System Flow Monitoring Technology at EBMUD," WEFTEC Annual Conference, 2009
- "Sacramento Regional County Sanitation District Interceptor Sulfide Generation Model," WEFTEC Annual Conference, 2007
- "Ahead of The Flow," Public Works Magazine, 2006
- "Oro Loma Sanitary District Bockman Lift Station: Flow Monitoring and I/I Analysis – A Case Study," CWEA Conference, 2004
- "Cost-Effective Collection System Assessment," HWEA Collection Systems Conference, 2003

Professional Summary

Kevin's expertise includes flow monitoring and analysis of inflow and infiltration (I/I) into collection systems, including development of synthetic I/I hydrographs and estimate of peak wet weather flows for design storm events. He has served as the QA/QC advisor and data manager and project manager on hundreds of projects for V&A throughout California and the Western United States. Kevin has been the project manager and technical advisor for all the following flow monitoring projects:

Relevant Experience

Eastern Municipal Water District (EMWD) Flow Monitoring & Model Calibration, Moreno Valley, CA

V&A completed sanitary sewer flow monitoring and rainfall monitoring with inflow and infiltration analysis over a period of approximately one month at 55 open-channel flow monitoring sites and five rain gauge locations. The purpose of this study was to measure sanitary sewer flows that can be used to calibrate the District's hydraulic model to prevent sanitary sewer overflow. V&A also performed a condition assessment on the diversion structures to confirm the flow routing in the system. V&A was retained the following year to conduct a similar flow monitoring and I/I analysis study on a different area of the EMWD system, which included 60 flow monitoring locations for approximately one month.

San Bernardino Municipal Water District 2018 Sewer Flow Monitoring and Inflow/Infiltration Study. San Bernardino, CA

V&A provided flow monitoring services at 20 sites for the San Bernardino Municipal Water District to assist with establishing baseline sanitary sewer flows, collect information pertaining to the capacity of the City's collection system, and perform rain-dependent infiltration and inflow (RDI/I) analysis. The flow monitoring was performed in a phased approach. Phase 1 consisted of 10 locations for 6.5 weeks on large-diameter pipelines intended to capture flows through main trunk lines and isolating major sewage basins. Phase 2 consisted of 10 locations for 4.5 weeks on small-diameter pipelines intended to measure flow rates within isolated smaller basins of specific usage types (i.e., residential, commercial, etc.). V&A prepared a technical report to summarize the field study and present results of monitoring and RDI/I analysis.

City of Anaheim West Anaheim 2015 Sanitary Sewer Flow Monitoring at 15 Sites for 3 Months. Anaheim, CA

V&A has completed sanitary sewer flow monitoring and rainfall monitoring within the west area of the City of Anaheim collection system. The analysis was performed over a consecutive 3-month period with open-channel flow meters at 15 sites and rain data collected from four rain gauge locations. This study established the baseline sanitary sewer flows at the flow monitoring sites, estimated available sewer capacity, isolated inflow and infiltration (I/I) response, and included I/I analysis.

City of San Jose Temporary Flow Monitoring, San Jose, CA

For the past 10 years, V&A has provided on-call flow monitoring services and data analysis for the City's sewer and stormwater facilities. The scope of work includes the installation of flow monitoring equipment inside sanitary sewer and storm manholes, remote data retrieval and removal of equipment, and creating reports with results and recommendations. In 10 years of on-call flow monitoring, V&A provided the City of San Jose sanitary sewer flow monitoring services on 39 separate flow monitoring projects that totaled 762 flow monitoring sites.

Port of Oakland - Oakland International Airport Sanitary Sewer and Lift Station Flow Monitoring. Oakland, CA

The objective of the flow monitoring project was to verify actual sanitary sewer flow rates at key nodes within the Port of Oakland (Port) collection system and perform infiltration/inflow (I/I) analysis. Five flow meters and two rain gauges were installed for two months to capture wet weather flows which discharge into the EBMUD left station. Additionally, V&A performed lift station flow monitoring at Sanitary Sewer Lift Station No. 6 and No. 8 within the at the Oakland International Airport in Terminal 2 in Oakland, California. Lift station monitoring included installing state loggers on the pump station leads to monitor pump lead/lag On/Off timing, and level loggers to verify wet well fill volume and fill rates. The flow monitoring and lift station data was analyzed for I/I response and submitted in a final report.

City of Riverside Master Plan Flow Monitoring, Riverside, CA

V&A performed wet weather sanitary sewer flow monitoring services within the City of Riverside (City) to establish average dry weather flows and evaluate the inflow and infiltration (I/I) response at 60 open-channel flow monitoring sites within the City's sanitary sewer system. The duration of the work was 1 month; pipe sizes ranged from 8 inches to 51 inches in diameter. This project was in support of a master planning effort.

City of Banning Master Plan Flow Monitoring, Banning, CA

V&A performed wet weather sanitary sewer flow monitoring services within the City of Banning (City) to establish average dry weather flows and evaluate the inflow and infiltration (I/I) response at 9 open-channel flow monitoring sites within the City's sanitary sewer system. The duration of the work was 1 month; pipe sizes ranged from 12 inches to 30 inches in diameter. This project was in support of a master planning effort.

Napa Sanitation District: Flow Monitoring & I/I Mitigation Services, Napa, CA

V&A has been conducting yearly, ongoing flow monitoring and I/I investigation services within the Napa Sanitation District (NSD) since 2005. In 2015, flow and rainfall monitoring were performed over a period of approximately one month at 23 open-channel flow monitoring sites and two rain gauge locations. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites, estimate available sewer capacity and conduct analyses pertaining to infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites. The final report also included recommendations regarding examination of reduction needs to determine a future I/I reduction program. V&A performed additional night-time I/I reconnaissance to investigate the collection system for sources of infiltration.

Cupertino Sanitary District—Wet Weather Open Channel Flow Monitoring at 28 Sites for 6 weeks. Cupertino, CA

V&A was retained to monitor 28 open channel sanitary sewer flow monitoring and 3 rain gauge locations with inflow and infiltration (I/I) analysis within the District. The purpose of this study was to measure sanitary sewer flows at the flow monitoring sites, estimate available sewer capacity and conduct analyses pertaining to infiltration and inflow (I/I) occurring in the basins upstream from the flow monitoring sites.

Downtown City of Santa Monica Flow Monitoring. Santa Monica, CA

V&A performed sanitary sewer flow monitoring at for the City of Santa Monica 25 open-channel sites over a two-week period in November 2015. The purpose of this study was to establish the baseline and peak flow conditions with results used for an Environmental Impact Report. V&A prepared a report summarizing peak recorded dry weather flows, levels, d/D ratios, peaking factors, and rim-to-invert measurements per site during the flow monitoring period.

19284 Beckonridge Lane 714 350-2131
H.B. CA. 92648

Gene R. Glassburner Jr.

Safety-Project Manager

Objective

I have used my 34 years of experience in the sanitation industry to build and operate a successful trenchless rehabilitation company.

Experience

2002 to present Performance Pipeline H.B. CA.
Owner

- Oversee the daily operations of all aspects of the company

1987-2011 Sancon Engineering H.B. CA.
Superintendent-Project Manager

- Supervised and managed 36 employees
- Worked directly with foreman in the completion of projects
- Estimator for projects
- Worked directly with city inspectors in completing projects
- Implemented training course for new employees

1985-1987 County Sanitation District of Orange F.V. CA.
Line and Pump station maintenance worker 2

- Cleaning sewer lines from 4" to 108" in Diameter.
- Operated high velocity flush trucks and balling machines
- Repaired and replaced sewage pumps
- Cleaned Wet Wells of debris

Qualifications

Gene has successfully cleaned, CCTV Inspected, installed and supervised over 3 million linear feet of trench less sewer and storm drain installations using the following methods: fold and form PVC pipe lining, slip lining with HDPE pipe, and CIPP pipe. He has completed thousands of sectional repairs and installed using CIPP UV Light cured pipe and link pipe sleeves repair patches. Additional responsibilities have included applying protective coatings for concrete structures, steel digesters and concrete manholes, chemical grouting water infiltration in pipe's structures and manholes.

License & Certifications

- NASSCO Certified # U 304-1120
- California Contractor's license C-42 #825824/ HIC Certificate
- Municipal Sewer Grout School Safety Training certificate
- Municipal Sewer Grout School NASSCO Specified Certificate
- Confined space entry certified
- CPR Training Certificate
- Supervisory Training (DOT CFR) Substance Abuse/Alcohol Misuse Certificate
- First Aid Certificate

WOODARD & CURRAN

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Laguna Hills, CA 92653

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woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

Fee Estimate
Trabuco Canyon Water District
Master Plan and Condition Assessment Study

Tasks	Labor															Outside Services						ODCs		Total
	Scott Goldman	Janet Fordunski	Kraig Erickson	Todd Prokop	Justin Kraetsch	Chris van Lienden	Kyle Corbeil	Samantha Weidenbenner	Carly Dykstra	Staff	Matt Elsner / Jen Glynn	Jennifer Ziv	Admin.	Total Hours	Total Labor Costs (1)	V&A	V&A	Performance PipelineTechnologies	Calvada	Subtotal	Sub Consultant Total Cost (2)	ODCs	Total ODCs (2)	Total Fee
	PIC	PM	Recycled Water Lead	Water Lead	Sewer Lead	Modeling Director	Water System Modeling	Sewer Modeling	Engineer 2	Engineer / Planner 1	QA/QC	Client Liason	Support Team			Flow Monitoring	Condition Assessment	CCTV Sewer Insp.	Survey 300 MH Inverts					
	$298	$265	$281	$281	$234	$281	$265	$249	$198	$171	$298	$298	$116											
Task 1: Data Gathering and Review																								
1.1 Data gathering and review		2	1			1	8	8	8	16				44	$9,524					$0	$0		$0	$9,524
1.2 Task 1 / Kickoff Meeting (virtual)	1	2	1	2	2	1						1		10	$2,718					$0	$0		$0	$2,718
Subtotal Task 1:	1	4	2	2	2	2	8	8	8	16	0	1	0	54	$12,242	$0	$0	$0	$0	$0	$0	$0	$0	$12,242
Task 2: Water Source Evaluation																								
2.1 Water Source Evaluation TM		8	4	4		2	8		8					34	$8,634					$0	$0		$0	$8,634
2.2 Task 2 Meeting (virtual)	1	2		2								1		6	$1,688					$0	$0		$0	$1,688
Subtotal Task 2:	1	10	4	6	0	2	8	0	8	0	0	1	0	40	$10,322	$0	$0	$0	$0	$0	$0	$0	$0	$10,322
Task 3: Hydraulic Model Software Updates																								
3.1 Recommendations for Modeling Applications TM						4	4	4	16					28	$6,348					$0	$0		$0	$6,348
Subtotal Task 3:	0	0	0	0	0	4	4	4	16	0	0	0	0	28	$6,348	$0	$0	$0	$0	$0	$0	$0	$0	$6,348
Task 4: Update Existing Water and Non-domestic Hydraulic Models																								
4.1 Update and calibrate models			30	20		16	30		80					176	$42,336					$0	$0		$0	$42,336
4.2 Hydrant test observation							8		16					24	$5,288					$0	$0	$200	$220	$5,508
4.3 Task 4 Meeting (virtual)	1	2	2			2	2					1		10	$2,780					$0	$0		$0	$2,780
Subtotal Task 4:	1	2	32	20	0	18	40	0	96	0	0	1	0	210	$50,404	$0	$0	$0	$0	$0	$0	$200	$220	$50,624
Task 5: Water and Non-domestic Water Demand Allocation / Analysis																								
5.1 Existing demands		8	16	16		8	24		80					152	$35,560					$0	$0		$0	$35,560
5.2 Future projections		4		8		4	16		40					72	$16,592					$0	$0		$0	$16,592
5.3 Scenario development and hydraulic network analysis		4	8	8		4	16		40					80	$18,840					$0	$0		$0	$18,840
5.4 Water and Non-domestic Water Systems Modeling TM		4	16	8		4	24		40		8			104	$25,592					$0	$0		$0	$25,592
5.5 Task 5 Meeting (virtual)	1	2	2	2		2	2					1		12	$3,342					$0	$0		$0	$3,342
Subtotal Task 5:	1	22	42	42	0	22	82	0	200	0	8	1	0	420	$99,926	$0	$0	$0	$0	$0	$0	$0	$0	$99,926
Task 6: Wastewater Collection System Hydraulic Model Development																								
6.1 Existing Model Loads		2			8	4		20	20					54	$12,466					$0	$0		$0	$12,466
6.2 Future Load Projections		2			8	2		6	10					28	$6,438					$0	$0		$0	$6,438
6.3 Develop Model Network					20	8		40	80					148	$32,728					$0	$0		$0	$32,728
6.4 Model Calibration		2			12	8		16	40					78	$17,490					$0	$0		$0	$17,490
6.5 Wastewater System Modeling TM		2			8	4		24	80		8			126	$27,726					$0	$0		$0	$27,726
6.6 Task 6 Meeting (virtual)	1	2			2	2		2				1		10	$2,654					$0	$0		$0	$2,654
Subtotal Task 6:	1	10	0	0	58	28	0	108	230	0	8	1	0	444	$99,502	$0	$0	$0	$0	$0	$0	$0	$0	$99,502
Task 8: Dry-weather Flow Monitoring																								
8.1 Flow Monitoring (5 collection + 8 Lift Station)					4	4		16						24	$6,044	$77,863				$77,863	$85,649		$0	$91,693
8.2 Task 8 Meeting (virtual)	1	2			2	2						1		8	$2,156					$0	$0		$0	$2,156
Subtotal Task 8:	1	2	0	0	6	6	0	16	0	0	0	1	0	32	$8,200	$77,863	$0	$0	$0	$77,863	$85,649	$0	$0	$93,849
Task 10: Capital Improvement Phasing Plans																								
10.1 Capital Improvement Phasing Plans Tech Memo	2	4	6	6	6				20	30	16			90	$20,290					$0	$0		$0	$20,290
10.2 Two (2) Task 10 Meetings (virtual)	2	4	4	4	4							2		20	$5,436					$0	$0		$0	$5,436
Subtotal Task 10:	4	8	10	10	10	0	0	0	20	30	16	2	0	110	$25,726	$0	$0	$0	$0	$0	$0	$0	$0	$25,726
Task 11: Condition Assessment																								
11.1 Desktop Condition Assessment				2	2									4	$1,030		$20,000			$20,000	$22,000		$0	$23,030
11.2 Lift Station Condition Assessment and Corrosion Eval. (8)	2	4			16					32				54	$10,872		$141,648			$141,648	$155,813		$0	$166,685
11.3 DWTP Transmission Main Condition Assessment		4		16						32				52	$11,028		$41,828			$41,828	$46,011		$0	$57,039
11.4 Task 11 Meeting (virtual)	1	2		2	2							1		8	$2,156					$0	$0		$0	$2,156
Subtotal Task 11:	3	10	0	20	20	0	0	0	0	64	0	1	0	118	$25,086	$0	$203,476	$0	$0	$203,476	$223,824	$0	$0	$248,910
Task 12: Update / Create Hydraulic Schematics																								
12.1 Hydraulic Schematics		2		4	4	4			12					26	$6,090					$0	$0		$0	$6,090
Subtotal Task 12:	0	2	0	4	4	4	0	0	12	0	0	0	0	26	$6,090	$0	$0	$0	$0	$0	$0	$0	$0	$6,090
Task 13: Recommend System Design Criteria																								
13.1 Recommend System Design Criteria TM		2		8	8	2				20				40	$8,632					$0	$0		$0	$8,632
Subtotal Task 13:	0	2	0	8	8	2	0	0	0	20	0	0	0	40	$8,632	$0	$0	$0	$0	$0	$0	$0	$0	$8,632
Task 14: Update Water Capacity Charges																								
14.1 Update Water Capacity Charges	4	8	8	8	8					65	8			109	$23,179					$0	$0		$0	$23,179
14.2 Two (2) Task 14 meetings (virtual)	2	4	4	4	4							2		20	$5,436					$0	$0		$0	$5,436
Subtotal Task 14:	6	12	12	12	12	0	0	0	0	65	8	2	0	129	$28,615	$0	$0	$0	$0	$0	$0	$0	$0	$28,615
Task 15: Updated Master Plan																								
15.1 Draft Master Plan		8	8	16	16	8	16	8	40	40				160	$35,848					$0	$0		$0	$35,848
15.2 Final Master Plan		4	4	4	4	4			16	16				52	$11,272					$0	$0		$0	$11,272
15.3 Two (2) Task 15 meetings (virtual)	2	4	4	4	4							2		20	$5,436					$0	$0		$0	$5,436
15.4 Three (3) 2-hour model workshops (virtual)						8	8	8						24	$6,360					$0	$0		$0	$6,360
Subtotal Task 15:	2	16	16	24	24	20	24	16	56	56	0	2	0	256	$58,916	$0	$0	$0	$0	$0	$0	$0	$0	$58,916
Task 16: Project Management and Board of Directors Presentation																								
16.1 Project Management		72											18	90	$21,168					$0	$0		$0	$21,168
16.2 Four (4) Progress Meetings (virtual)	4	8										4		16	$4,504					$0	$0		$0	$4,504
16.3 Board of Directors Presentation (in-person)	4	8										4		16	$4,504					$0	$0	$100	$110	$4,614
Subtotal Task 16:	8	88	0	0	0	0	0	0	0	0	0	8	18	122	$30,176	$0	$0	$0	$0	$0	$0	$100	$110	$30,286
TOTAL without Optional Tasks	29	188	118	148	144	108	166	152	646	251	40	21	18	2029	$470,185	$77,863	$203,476	$0	$0	$281,339	$309,473	$300	$330	$779,988
OPTIONAL Task 7: Sewer Manhole Survey (Optional)																								
7.1 Sewer Manhole Survey		1			2				8	8				19	$3,685				$130,500	$130,500	$143,550		$0	$147,235
Subtotal Task 11:	0	1	0	0	2	0	0	0	8	8	0	0	0	19	$3,685	$0	$0	$0	$130,500	$130,500	$143,550	$0	$0	$147,235
OPTIONAL Task 9: CCTV Sewer Inspection (Optional)																								
9.1 CCTV Sewer Inspection		1			2				8	8				19	$3,685			$185,250		$185,250	$203,775		$0	$207,460
Subtotal Task 12:	0	1	0	0	2	0	0	0	8	8	0	0	0	19	$3,685	$0	$0	$185,250	$0	$185,250	$203,775	$0	$0	$207,460

1. The individual hourly rates include salary, overhead and profit.
2. Subconsultants will be billed at actual cost plus 10%
3. Other direct costs (ODCs) such as reproduction, delivery, mileage (rates will be those allowed by current IRS guidelines), and travel expenses, will be billed at actual cost plus 10%.
4. Woodard & Curran reserves the right to adjust its hourly rate structure and ODC markup at the beginning of the calendar year for all ongoing contracts.