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EDUCATION

M.S., Environmental Engineering, University of California at Berkeley, 1994
B.S., Civil Engineering, Tufts University, Medford, Massachusetts, 1993

LICENSE

Professional Civil Engineer in California (C056151) - 1996

TECHNICAL EXPERIENCE

Prior to forming Starr Consulting in 2004, Ms. Starr worked for MWH Americas, Inc. for over ten years. Ms. Starr has over 20 years of experience in the fields of source water assessment and protection, drinking water quality and regulations, monitoring plan development and implementation, and drinking water treatment. Provided below are key highlights of technical experience.

Watershed Sanitary Surveys and Source Water Protection

Project Manager for the Source Water Protection Services for the City of Sacramento. Responsible for overall project management and well as development and implementation of technical work. Technical projects included investigation and summary of the Aerojet Superfund Site, Industrial Dischargers, Pesticide Follow Up, American River source water protection activities, and development of Spill Notification Programs for the American and Sacramento rivers.

Project Manager for the 2015 and 2010 Updates to the Sacramento River Watershed Sanitary Survey for the Cities of Sacramento and West Sacramento, Placer County Water Agency, City of Roseville, Sacramento County Water Agency, East Bay Municipal Utility District, and Woodland-Davis Clean Water Agency. Responsible for overall project management and client coordination, review of technical work related to water quality evaluations, conduct of contaminant source identification and evaluation, and review of water treatment plant evaluations. Also responsible for evaluation of the data collected and development of recommendations to improve source water quality and treatment operations.

Project Engineer for the preparation of the 2016 and 2011 Updates to the Lake Jennings Watershed Sanitary Survey for Helix Water District. Responsible for technical evaluation related to source water quality and treatment plant evaluation. Also contributed to development of recommendations to improve source water quality and treatment operations.

Project Manager for the 2015 and 2010 Updates to the Sayles Creek Watershed Sanitary Survey for the City of Sacramento Camp Sacramento. Responsible for technical evaluation of water quality and watershed contaminant sources data, regulatory framework and water treatment plant evaluation, and recommendation development.

Project Manager for the American River Watershed Sanitary Survey 2013 and 2008 Updates for the City of Sacramento. Responsible for overall project management and client coordination, review of technical work related to water quality evaluations, development of contaminant source identification and evaluation, and review of water treatment plant evaluations. Also responsible for evaluation of the data collected and development of recommendations to improve source water quality and treatment operations. Conducted a special study to evaluate chlorination practices at the City of Sacramento's E.A. Fairbairn Water Treatment Plant.

Project Engineer for the Lytle Creek Watershed Sanitary Survey 2013 and Second Updates for the West Valley Water District and the City of Rialto. Responsible for development of technical work related to water quality data evaluation and regulatory compliance of the drinking water treatment plant. Participated in development of key findings and recommendations to maintain/improve source water quality and treatment operations. Assisted District with working with the Department of Public Health to modify the Water Supply Permit for source water triggers for additional log treatment.

Project Engineer for the Sweetwater/Loveland Reservoirs Watershed Sanitary Survey 2012 and 2007 Updates for the Sweetwater Authority. Responsible for development of technical work related to water quality data evaluation and regulatory compliance of the drinking water treatment plant. Participates in development of key findings and recommendations to maintain/improve source water quality and treatment operations.

Project Manager for the Yuba/Bear River Watershed Sanitary Survey 2012 and Second Updates for Placer County Water Agency and Nevada Irrigation District. Responsible for overall project management and client coordination, review of technical work related to water quality evaluations, development of contaminant source identification and evaluation, and review of water treatment plant evaluations. Also responsible for evaluation of the data collected and development of recommendations to improve source water quality and treatment operations.

Project Engineer for the State Water Project Watershed Sanitary Survey. Responsible for development of technical work related to pathogen (bacteria, *Giardia*, *Cryptosporidium*) data evaluation and regulatory compliance. Conducted Delta watershed contaminant source identification and evaluation. Worked with consultant team on development of key findings.

Project Engineer for the 2009 Lake Arrowhead Watershed Sanitary Survey for the Lake Arrowhead Community Services District. Responsible for technical evaluation related to source water quality and treatment plant evaluation. Also contributed to development of recommendations to improve source water quality and treatment operations.

Project Engineer for the City of Santa Cruz Desalination Plant Watershed Sanitary Survey. Worked with consultant team on delineation of appropriate watershed boundary for ocean intake. Responsible for development of technical work related to water quality data evaluation and regulatory planning for the desalination plant. Involved in coordination with the Department of Public Health on the appropriate level of microbial treatment. Assisted with development of contaminant source identification and evaluation. Worked with consultant team on development of key findings and recommendations to ensure optimum source water quality and treatment operations.

Project Engineer for the Santa Ana River Watershed Sanitary Survey 2007 Update for the City of Redlands and East Valley Water District. Responsible for development of technical work related to water quality data evaluation and regulatory compliance of the drinking water treatment plant. Assisted with development of key findings and recommendations to maintain/improve source water quality and treatment operations.

Project Manager for the Follow Up Services to the Yuba/Bear River WSS for Placer County Water Agency. Responsible for developing a monitoring program along the canal systems identified in the WSS as a potential risk to track the timing and location of the water quality impacts. This occurred over a one year monitoring season and resulted in identification of three areas of interest for further investigation and action.

Project Engineer for the Mill Creek Watershed Sanitary Survey Second Update for the City of Redlands and East Valley Water District. Responsible for development of technical work related to water quality data evaluation and regulatory compliance of the drinking water treatment plant. Participated in development of key findings and recommendations to maintain/improve source water quality and treatment operations.

Technical Advisor for the Clear Lake Watershed Sanitary Survey Second Update for Clear Lake Water Users. Responsible for development of overall workplan and technical advice and assistance on technical work related to water quality evaluations, contaminant source identification and evaluation, and water treatment plant evaluations.

Project Engineer for the Solano Project Below Monticello Dam Watershed Sanitary Survey 2006 Update for Solano County Water Agency. Responsible for technical work related to development of contaminant source identification and evaluation. Participated in development of key findings and recommendations to maintain/improve source water quality and treatment operations.

Project Manager for the Sacramento River Watershed Sanitary Survey Second Update for the Cities of Sacramento and West Sacramento, Placer County Water Agency, City of Roseville, Sacramento County Water Agency, and East Bay Municipal Utility District. Responsible for overall project management and client coordination, review of technical work related to water quality evaluations, development of contaminant source identification and evaluation, and review of water treatment plant evaluations. Also responsible for evaluation of the data collected and development of recommendations to improve source water quality and treatment operations.

Technical specialist for the Colorado River Watershed Sanitary Survey Second Update for the Metropolitan Water District (MWD) of Southern California. Responsible for development of technical work related to water quality data evaluation and regulatory compliance of the drinking water treatment plants.

Project Manager for the Colorado River Watershed Sanitary Survey Update for the Metropolitan Water District (MWD) of Southern California. Responsible for development of technical work related to contaminant source identification and evaluation. Evaluated the data collected and assisted with the development of recommendations to improve source water quality and treatment operations. Provided overall technical oversight of entire report. Provided additional assistance with regard to development of a policy on equestrian uses in the watershed of MWDs terminal reservoirs.

Project Manager for the Sacramento River Watershed Sanitary Survey Update for the Cities of Sacramento and West Sacramento. Responsible for development of technical work related to water quality evaluations, contaminant source identification and evaluation, and water treatment plant evaluations. Also responsible for evaluation of the data collected and development of recommendations to improve source water quality and treatment operations.

Project Engineer for the Freeport Regional Diversion Project on the Sacramento River for Sacramento County Water Agency and East Bay Municipal Utility District. Responsible for development of technical work related to water quality evaluations, contaminant source identification and evaluation, and water treatment plant evaluations. Also participated in the evaluation of reverse flow and seasonal diversions impacts to source water quality.

Project Manager for the Clear Lake Watershed Sanitary Survey Update for Clear Lake Water Users. Responsible for development of technical work related to water quality evaluations, contaminant source identification and evaluation, and water treatment plant evaluations. Also responsible for evaluation of the data collected as well as development of recommendations to improve source water quality and treatment operations.

Project Manager for the American River Watershed Sanitary Survey Updates. Responsible for development of technical work related to water quality evaluations, contaminant source identification and evaluation, and water treatment evaluations. Also responsible for coordination with all eleven participating water agencies. The data

collected was evaluated and used to develop recommendations to improve source water quality and treatment operations.

Project Manager for the Drinking Water Source Assessment Program for Folsom Lake for the Cities of Roseville and Folsom and San Juan Water District. Responsible for development of watershed-wide and protection zone maps as well as identification and evaluation of the contaminant sources within these areas. A vulnerability assessment was conducted based on the information collected to determine activities of highest risk to the water supply.

Project Manager for the Drinking Water Source Assessment Program for the City of Roseville's groundwater system. Responsible for development of watershed-wide and protection zone maps as well as identification and evaluation of the contaminant sources within these areas. A vulnerability assessment was conducted based on the information collected to determine activities of highest risk to the water supply.

Project Manager for the Drinking Water Source Assessment Program for the Sacramento County Water Agency's groundwater system. Responsible for development of watershed-wide and protection zone maps as well as identification and evaluation of the contaminant sources within these areas. A vulnerability assessment was conducted based on the information collected to determine activities of highest risk to the water supply.

Drinking Water Quality and Regulations

Project Manager for development of annual Consumer Confidence Reports for San Juan Water District (2003 through 2015) and Elk Grove Water District (2013 and 2014). Responsible for review of regulatory revisions, data assessment, preparation of reportable information, and coordination with Division of Drinking Water on submittal.

Project Manager for regulatory compliance evaluations for the City of Sacramento, San Juan Water District, City of Roseville, and Placer County Water Agency. Responsible for tracking all current and future drinking water regulations, both at the Federal and State levels, which may impact surface water and ground water facilities. Tracks the regulations on an on-going basis and provides a summary of recent events to each agency in a quarterly update, highlighting the potential impacts of the regulations on the agency.

Project Manager for the distribution system disinfection byproduct evaluation for Sacramento County Water Agency. Responsible for review of disinfection byproducts and related water quality data in the distribution system to evaluate the movement and location of the new surface water supply throughout the system. The result of this evaluation was an updated Stage 2 D/DBP monitoring plan.

Project Manager for the source water quality analysis and distribution system evaluation for Sacramento Suburban Water District. Responsible for review of water quality, water supply, and operations data to identify the possible causes of coliform detections and low chlorine residual areas. The result of the evaluation was identification of potential sources and development of a remediation plan.

Project Manager for the review and development of chemical monitoring waiver requests for the City of Sacramento, City of Roseville and San Juan Water District. As part of this project responsible for review of historical raw and treated water monitoring, waivers previously granted, and new regulatory requirements. This information was used to determine which constituents should be evaluated for monitoring waivers. Additional research was conducted to obtain available ambient monitoring data and chemical use information. Developed chemical monitoring waiver request letters for each source water and negotiated the waivers with the Department of Health Services.

Technical specialist to assist with development of compliance materials to meet the upcoming requirements of the Stage 2 Disinfectants and Disinfection By-Products Rule and the Long Term 2 Enhanced Surface Water Treatment

Rule for the cities of Sacramento and Roseville, San Juan Water District, Carmichael Water District, Placer County Water Agency, and Sacramento County Water Agency.

Project Manager for the Evaluation of Drinking Water Quality Goals for the California Urban Water Agencies as part of the Central Valley Regional Water Quality Control Board Drinking Water Policy. This project included the identification of water quality objectives, standards, goals, and policies that have been developed to protect drinking water supplies related to disinfection by-product precursors, dissolved minerals, nutrients, and pathogens. This involved reviewing data from other regions of California, USEPA, other selected states, and other selected countries. A final technical memorandum summarized all the findings and made recommendations on appropriate standards for the Central Valley.

Water quality specialist for development of a data management system for the Sacramento Groundwater Authority. Compiled and analyzed the water quality data and sampling and analysis protocols of 17 local water purveyors to develop a cost-efficient and effective groundwater monitoring program for SNAGMA. The result was a "state-of-the-basin" report that provided the baseline for conjunctive use projects in the basin.

Water quality specialist for development of a regional conjunctive use program for the American River Basin Coordinating agencies. Analyzed raw surface water and groundwater data to evaluate potential uses and problems associated with a regional conjunctive use program. Potential treated water quality impacts were identified based on water blending, treatment and transmission and possible management strategies were identified.

Drinking Water Treatment

Project Manager for development of a Filtration Study for the Alta Water Treatment Plant for Placer County Water Agency. The project included development of a plant-scale study to increase the filtration loading rate of the water treatment plant. This included coordination with the Division of Drinking Water to obtain approval to implement the study as well as on-going implementation assistance and data evaluation.

Technical specialist responsible for water quality evaluation to determine the appropriate level and type of treatment for the new Vineyard Surface Water Treatment Plant for Sacramento County Water Agency. Also led the coordination tasks with the Division of Drinking Water during preliminary and final design.

Project Engineer for the treatment facilities component of the Feasibility Engineering for the Sacramento River Water Reliability Study for US Bureau of Reclamation, Placer County Water Agency, City of Sacramento, City of Roseville, and Sacramento Suburban Water District. Technical responsibilities include treatment plant preliminary design criteria development, regulatory compliance issues, future regulatory requirements, coordination of multi-agency delivery scenarios, and review of construction cost estimates.

Staff Engineer for the preliminary design for expansion of the E.A. Fairbairn Water Treatment Plant and the Sacramento River Water Treatment Plant for the City of Sacramento. Involved with regulatory compliance issues, future regulatory requirements, and treatment plant preliminary design criteria development. Also involved with the preliminary design of E.A. Fairbairn WTP's flocculation and sedimentation basins, chlorine contact basin, and proposed future ozone facilities.

Project Engineer for the design and construction of the City of Sacramento's fluoride chemical feed systems at the Sacramento River Water Treatment Plant and the E.A. Fairbairn Water Treatment Plant. Responsible for development of a technical memorandum on the preliminary design of the facilities and design of fiberglass bulk storage tanks, fiberglass equipment enclosure, on-line fluoride analyzers, electrical systems, and chemical metering pump systems. Responsible for direct procurement of the major equipment items for the project based on design specifications and then coordination with contractor to install the project.

Project Engineer for the design of the City of Sacramento's alum chemical feed system at the E.A. Fairbairn Water Treatment Plant. The purpose of this project was to improve the reliability of the primary chemical feed system. Responsible for design and procurement of a stainless steel day tank and chemical metering pump configuration. The project was completed in a design-build fashion with the main equipment procured and installed by the City after completion of design.

Project Engineer for the Operational Services Agreement for the City of Sacramento. Developed contract documents for installation of a clearwell baffle curtain in the clearwell at the E.A. Fairbairn WTP. Reviewed the underwater investigation of the existing baffle and investigated alternative baffle installation methods. Prepared contract drawing and specifications for installation of a fabric curtain. Evaluated the disposal options for excess water treatment sludge at the City's Sacramento River WTP. Investigated the type and amount of sludge present and the available options for disposal. Assisted the City in evaluating and selecting a disposal alternative.

Project Engineer for the scoping study and preliminary design for expansion of the Waterman Water Treatment Plant for the City of Fairfield. Technical responsibilities include conducting an initial plant visit and assessment, review of potentially appropriate treatment technologies, coordination with regulatory agencies to initiate project consultations, and detailed water quality and drinking water regulatory evaluations.

Project Engineer for the treatment facilities component of the Feasibility Engineering for the Sacramento River Water Reliability Study for US Bureau of Reclamation, Placer County Water Agency, City of Sacramento, City of Roseville, and Sacramento Suburban Water District. Technical responsibilities include treatment plant preliminary design criteria development, regulatory compliance issues, future regulatory requirements, coordination of multi-agency delivery scenarios, and review of construction cost estimates.

Staff Engineer for the Waste Washwater and Lagoon Evaluation Project for the Anchorage Water and Wastewater Utility. Responsible for collecting and evaluating process data to estimate waste washwater and solids production at the Eklutna Water Treatment Facility and Ship Creek Water Treatment Facility. Used liquid and solids production information to evaluate existing capacity of water treatment facilities to handle wastes and identified multiple alternatives for future waste handling. Also conducted drinking water regulatory compliance audit for both water treatment facilities.

Project Engineer for the evaluation of the existing San Joaquin County Groundwater Monitoring Program. Responsible for the development of monitoring program objectives, evaluation of the existing monitoring procedures, and development of a comprehensive monitoring program for salinity assessment. The monitoring program evaluation included field visits with staff to increase knowledge of actual procedures implemented. The final monitoring plan developed for the County included detailed sampling procedures, analytical requirements, and QA/QC review.

Staff Engineer for the Water Supply Master Plan for Beaver Water District. Responsible for evaluating water quality data, conducting a drinking water regulatory compliance audit for current and future regulations, identifying potential water quality concerns, and assisting with identification of treatment process modifications which may be required to meet future regulations.

Staff Engineer for the City of Roseville on a water quality and regulations investigation conducted as part of their WTP expansion. Collected all the available raw, process and treated water quality and performed evaluations. Provided the City with a technical memorandum that summarized the existing water quality, regulatory considerations, and identified potential water treatment goals for the expanded water treatment facilities.

Project Engineer for the Engineering and Laboratory Services for the Information Collection Rule (ICR) for San Juan Water District. Serving as the ICR Coordinator for the District. Responsible for project coordination, schedule

compliance and regulatory communication. An initial sample plan was developed for the surface water treatment plant and the distribution system based on the ICR requirements. Coordinated 18-months of sample collection and laboratory analysis and is responsible for evaluation of the data collected.

Staff Engineer for the Water Supply Alternative Evaluation for Mather Air Force Base for the Air Force. Responsible for evaluation of groundwater quality of domestic wells adjacent to the Air Base to determine treatment requirements necessary. Concentrations of trichloroethylene and perchloroethylene were evaluated for removal by treatment using aeration and granular activated carbon. A treatment technology was recommended based on required treatment efficiency and cost effectiveness.

Staff Engineer for the Pipeline Alignment Assessment Project for East Bay Municipal Utilities District. She provided a preliminary pipeline alignment for the Pump Back of American River Water from the Confluence to the E.A. Fairbairn WTP. This involved collecting information on existing facilities and utilities. The project involved identification and evaluation of the proposed alternatives. Developed information that was presented and discussed at a client meeting to finalize which alternative alignment would be selected.

Project Engineer for the Cost Estimates for Alternatives to the Feather River Diversion and Water Treatment Plant for Placer County Water Agency. This project involved reviewing the preliminary design of three water supply, conveyance and treatment alternatives. Each alternative included diversion structure, conveyance and pumping facilities and treatment facilities. Responsible for reviewing the preliminary designs, optimizing facilities as necessary and developing cost estimates for each alternative. A present worth analysis was performed for each alternative.

Staff Engineer for the Pipeline Optimization Project for the City of Sacramento. This project involved preliminary sizing and alignment determination for a new large diameter pipeline from a new intake to the existing water treatment plant. Responsible for hydraulic optimization of the pipeline and pumping facilities. Also responsible for identifying existing facilities that may be crossed along the proposed pipeline alignment and selecting the least impacted alternative.

Staff Engineer for the design of the pipeline for the Bay Point Pipeline Project for Contra Costa Water District. This consisted of approximately 3.5 miles of 20-inch and 16-inch steel pipe and 1 mile of 16-inch and 12-inch ductile iron pipe. The design included the pipe, appurtenances such as air release valves and air vacuum valves and blowoffs, and the cathodic protection of the pipeline.

Water Resources

Staff Engineer for the Regional Water Master Plan developed by the American River Basin Cooperating Agencies, a group of 17 water purveyors within northern Sacramento County and Placer County. Responsible for evaluating the baseline water quality of each potential source water for the region including the American River, the Sacramento River and the groundwater basin in northern Sacramento County. Also responsible for summarizing all existing and proposed drinking water regulatory requirements and implications. Using the baseline water quality data and the regulatory framework, evaluated the water quality impacts for each potential source water and distribution alternative.

Staff Engineer for the Water Supply Alternative Evaluation for Washoe County, Nevada. Responsible for collecting existing information for each water supply alternative, developing project descriptions and costs, developing multi-faceted evaluation criteria, and evaluating the alternatives to determine the best water supply strategy for the region.

Staff Engineer for the Water and Wastewater Master Plan for the City of Yuba City. Responsible for evaluating future wastewater production and water demand projections. Also involved with the evaluation of the existing water and wastewater treatment facilities.

Wastewater Collection Rehabilitation

Project Engineer for the Sewer Rehabilitation Project for the City of Los Altos. The project consisted of over 4000 feet of 6-inch vitrified clay pipe and associated laterals in urban areas. Responsible for coordinating video inspection of the sewer, evaluation of the existing sewer, and recommendation and design of a rehabilitation method. Developed the contract specifications and drawings for lining the sewer facilities. Specifications were developed for both cured-in-place-pipe and folded PVC liner.

Staff Engineer for the Sewer Rehabilitation Project for the City of San Jose. The project consisted of 1800 feet of 60-inch concrete pipe. Responsible for coordinating video inspection and manned entry and inspection of the sewer.

Staff Engineer for the Evaluation and Design of Repairs of the Sewer for the City of Stockton. This project consists of nearly 12 miles of sewer trunks in urban areas. Involved in the development of the Preliminary Design Report. This document was prepared using the results of the Technical Memorandum developed in previous stages of the project. The document reviewed the existing conditions of the sewer trunks, existing rehabilitation methods, and made recommendations to the City on the method and timing of proposed rehabilitation for the sewer trunks. The document was developed to allow ease in reading and understanding of the technical information presented.

Storm Water Monitoring and Management

Task Order Manager for two years for the California Department of Transportation's NPDES monitoring for freeway sites throughout the state on the Storm Water Monitoring Program. Developed monitoring plans, QA/QC plans and Health and Safety plans for eleven Caltrans NPDES storm water monitoring sites in California. Served as the Monitoring Coordinator. In this roll, coordinated all sampling events, laboratory work, and produce post storm technical memorandum for Caltrans. Upon completion of the monitoring for the 1998 wet season, developed a summary report for each monitoring site that presented and analyzed the existing data for trends.

Technical Advisor for California Department of Transportation for development of the Stormwater Monitoring Protocol Guidance Manual. This manual is used for all monitoring conducted by Caltrans.

Permitting

Lead Engineer responsible for developing the Permit Acquisition Plan for the proposed new intake, water treatment facilities, pipelines, and booster pump station as part of the Sacramento River Water Reliability Study for the US Bureau of Reclamation, Placer County Water Agency, City of Sacramento, City of Roseville, and Sacramento Suburban Water District. This involved coordinating with federal, state and local agencies that govern fisheries habitat, flood control, navigation, recreation, and air quality regulations. A permit acquisition plan was developed to summarize permit requirements and identify a strategy to work with agencies to obtain permits in a timely manner.

Project Engineer for the Program Management for the Water Facilities Expansion Program for the City of Sacramento. Responsible for coordinating with and obtaining permits from all permitting agencies for the Sacramento River Water Treatment Plant Replacement Intake Structure, the E.A. Fairbairn Water Treatment Plant Modified Intake Structure, the Sacramento River Water Treatment Plant Expansion, and the E.A. Fairbairn Water Treatment Plant Expansion. This involved coordinating with federal, state and local agencies that govern fisheries habitat, flood control, navigation, recreation, and air quality regulations.

AFFILIATIONS

American Water Works Association

Ad-Hoc Committee on Development of Interim Enhanced Surface Water Treatment Rule for the State of California, 1999 - 2001

PUBLICATIONS/PRESENTATIONS

"Keeping It Out! The American and Sacramento Rivers Spill Notification Programs", CA/NV AWWA Spring Conference, 2009.

"Sanitary Surveys and Corrections of Deficiencies", USEPA Workshops on IESWTR/DBPR Implementation, Various Dates and Locations, 2000

"The Sacramento and American Rivers; From Source Assessment to Source Protection", CA/NV AWWA Fall Conference Presentation, October 2001 and AWWA Annual Conference and Exhibition, June 2003