

Experience Summary

Mr. Crites is Brown and Caldwell's Natural Systems Service Leader. He has extensive experience in reuse and disposal of numerous types of industrial wastes including projects for vegetable and fruit processing, winery, brewery, meat processing and chemical wastewater. His expertise is in studies, designs, monitoring and operations advice for pretreatment, land application and reuse.

He was the senior author of the California League of Food Processors' Manual of Good Practice on Land Application of Process Water. He has managed the preparation of Stormwater Pollution Prevention Plans for Campbell Soup and Sun-Maid Raisins. He has managed the preparation of 20 reports of waste discharge for food processors in the central valley.

Assignment

Project Manager

Education

Engineer's Degree, Sanitary Engineering, Stanford University, 1970

M.S., Sanitary Engineering, Stanford University, 1968

B.S., Civil Engineering, California State University, Chico, 1967

Registration

Professional Civil Engineer No. 21532, California, 1972

Professional Engineer No. 13506, Oregon, 1987

Professional Engineer No. 7795, Hawaii, 1993

Experience

45 years

Joined Firm

1997

Awards

2009 WEF Thomas R. Camp Medal for Basic Research Contributions to Wastewater

Relevant Expertise

- *Land application*
- *Regional Water Quality Control Board permitting*
- *Industrial wastewater processing*

BOD Land Treatment Rate Study, California State University, Fresno Foundation, California

Project Officer. Ron provided consultation to the Water Institute of CSU Fresno on a biochemical oxygen demand (BOD) loading rate study. An EPA grant of \$25,000 and \$10,000 from SK Foods was used to fund an investigation of the different BOD loading rates surface irrigation of tomato process water. Ron used suction lysimeters to gather vadose water samples and compare percolate water from varying loading rates. The result was a peer reviewed article with Regional Board co-authors establishing the credibility of the loading rate model for food processing applications.

Land Treatment Technology Update, U.S. Environmental Protection Agency

Project Manager. Ron is the principal author of a process technology update issued in 2006, including slow rate, soil aquifer treatment and overland flow land treatment. Additional subjects included phytoremediation, phosphorus retention, biochemical oxygen demand loading rates and nitrogen removal with organic nitrogen applications.

Manual of Good Practice for Land Application of Food Processing/Rinse Water, California League of Food Processors, Sacramento, California

Project Manager. Ron managed the development of a manual of good practice for land application of food processing/rinse water in 2007. He provided guidelines for design and monitoring of land application systems. He presented the new manual to food processors and regulators in a workshop.

Campbell Soup Dixon RWD, Campbell Soup Supply Company, Dixon, California

Project Manager. Ron managed the report of waste discharge to add a vegetable processing line to the tomato processing operation. The RWD expanded the land application area from 555 acres to 606 acres and the operating season from 90 to 140 days. Tailwater control over the surface irrigation system was improved to minimize storm runoff in the fall.

Ron managed the preparation of monthly, quarterly and annual reports to the Regional Water Board for the Dixon land application system monitoring and reporting program. The work included siting and developing three new monitoring wells, assessing the groundwater quality and developing statistical evaluations of the trends in water quality.

Land Application Facilities, Olam Tomato Processors, Williams, California.

Project Manager. Ron prepared a report of waste discharge for the treatment of 4.0 mgd of tomato canning wastewater on more than 800 acres of land. A monitoring well installation plan was prepared, accepted by Regional Board staff and implemented. A revised monitoring and reporting program was developed that covered monitoring of the quality of the effluent, soil and groundwater. A cropping and irrigation management plan was also prepared. New Waste Discharge Requirements were received and implemented. Monitoring well installations, quarterly annual and monthly monitoring reports, and consumer confidence reports for the plant's water supply have been developed and submitted from 2006 to the present.

Ron managed the design of the pipeline connecting the processing plant to the new site.

Rio Pluma, Stapleton-Spence, Gridley, California, Solids Management Plan

Project Manager. Process wastewater from the processing of prunes and other juices is treated in an aerated pond and discharged to the City of Gridley's sewer system. The aerated pond system produces an excess of suspended solids, so the solids are removed by flotation. Ron led an investigation of alternatives for beneficial use of the prune solids and biosolids from the aerated pond.

Del Monte Land Treatment, Del Monte, Kingsburg, California

Technical Leader. The Regional Water Board issued a notice of violation to the Kingsburg land application site for groundwater degradation. Ron directed a revised monitoring well network and developed a BOD loading rate study designed to evaluate sprinkler application at different BOD loading rates. A network of lysimeters was designed along with oxygen monitoring over a two year period. The results showed positive dissolved oxygen in the soil profile, which validated the model.

Olam Tomato Processors, Lemoore, California

Project Manager. Ron is the Client Service Manager and senior reviewer for this 655 acre land application site. Ron provided advice on alternative sites for land application and permitted a 13-acre site for land application of biosolids from the aerated pond.

Ron evaluated the previous 2,600 land application site and obtained a permit for flows up to 4.5 mgd of tomato wastewater. Site evaluation included soil sampling analysis and interpretation, hydropunch sampling of groundwater and a network of monitoring wells.

Ron led the design of an emergency storage pond conversion to provide settling of grit from the tomato process water and equalization storage prior to pumping effluent to the land application site. Pretreatment for solids reduction improved the water quality in the processing.

Advice on Land Application, Patterson Vegetable Company, Patterson, California

Project Manager. Ron evaluated the land application system operated by Patterson Vegetable Company to determine if the current land application area was adequate or excessive for treatment and reuse. The 2.5 mgd system operates with two aerated ponds in series, a rapid infiltration system, a dedicated sprinkler irrigation system and a flood irrigation system that uses a combination of process water and canal water for alfalfa irrigation.

Irrigation System Design, ConAgra Grocery Products Company, Oakdale, California

Project Manager. Ron managed the design of facilities to expand irrigation up to 200 acres for tomato wastewater. The facilities included a pipeline, tailwater collection system and pond and pump stations. Permits were obtained from the County and the Regional Water Quality Control Board.

Irrigation System Design, Frito-Lay, Inc., Bakersfield, California

Project Manager. Ron managed the design of seven center pivot irrigation units for 1.3 mgd of potato and snack food processing wastewater. The project included permitting of 310 acres of irrigation area, construction

management for pump station, pipeline and center pivot installation and installation of six suction lysimeters for soil-water monitoring.

Campbell Soup Septic/Leachfield, Campbell Soup Supply Co, LLC, Dixon, California

Project Manager. This is a Design-Build project to complete the design and construction of a septic/leachfield system. Ron managed the design of a new septic tank and pressure-dosed leachfield for 3,000 gpd of domestic wastewater. Solano County permits and approvals were acquired and decommissioning and closure plans were prepared for the Regional Water Board.

Land Application Force Main Design, ConAgra Grocery Products Company, Oakdale, California

Project Manager. Ron managed the preliminary design of a three-mile, 18-inch force main to deliver five mgd of tomato wastewater to a land application site.

Treatment Alternatives Evaluation, Basic Vegetable Products, King City, California

Project Manager. Ron studied the options for treatment improvement, pH and odor control for 2.4 mgd of onion and garlic wastewater.

Environmental Assessment, ConAgra Grocery Products Company, Davis and Oakdale, California

Project Manager. Ron prepared an environmental assessment for two tomato canneries including water, wastewater, solid waste, noise and air quality.

Waste Discharge Study, Rogers Foods, Livingston, California

Project Manager. Ron supervised the preparation of a report of waste discharge and operating plan for land application of 0.9 mgd of onion and garlic processing wastewater.

Planning Assistance, Morning Star Company, Volta, California

Project Manager. Ron provided advice on land application and cooling ponds for a tomato processing plant.

Irrigation System Evaluation, Gilroy Canning Company, Gilroy, California

Project Manager. Ron prepared a report on operational improvements and cost savings for the sprinkler irrigation system.

Treatment and Disposal System Design, Hilltop Cold Storage, Watsonville, California

Project Manager. Ron prepared a report of waste discharge and supervised design of facilities for strawberry and fruit processing treatment and disposal by land application. He provided advice on expansion of facilities to irrigate adjacent land. He provided cost estimates and design for filtration followed by sprinkler irrigation of artichokes.

Irrigation System Design, Contadina Foods, Inc., Hanford, California

Project Engineer. Ron designed a 1.5-mgd irrigation system for a tomato cannery and prepared a report on the environmental impacts of wastewater and waste solids application to the land.

Experience Summary

Dr. Beggs has 35 years of experience in environmental engineering, soil-water systems and water resource management. His particular areas of expertise include engineering and project management for natural wastewater treatment systems, wetlands systems, water reclamation, groundwater quality, agricultural irrigation, water resources planning, biosolids reuse and food processing wastewater systems. He has substantial expertise in soil-water transport processes and soil-water and groundwater quality monitoring. Rob also has extensive experience working with the Regional Water Boards to establish discharge requirements for reclamation, land application, and discharge to surface waters.

Education

Ph.D., Biological Systems Engineering, University of California, Davis, 2005

M.S., Agricultural Engineering, Utah State University, 1981

B.S., Mechanical Engineering, University of California, Davis, 1977

B.S., Agricultural Engineering, University of California, Davis, 1977

Registration

Professional Civil Engineer 46503, California, 1991

Professional Agricultural Engineer 470, California, 1986

Irrigation Association Certified Level III Designer for Sprinkler Irrigation Systems and Drip Irrigation Systems, 1985

Experience

35 years

Joined Firm

2002

Relevant Expertise

- *Natural wastewater treatment systems*
- *Wetlands evaluation and design*
- *Wastewater reclamation and reuse*
- *Biosolids reuse*
- *Agricultural irrigation*
- *Food processing wastewater systems*
- *Groundwater resources and monitoring*
- *Regional Water Quality Control Board permitting*

Wastewater

Water Pollution Control Facility Upgrade, City of Woodland, California

Project Manager. The Woodland WPCF requires upgrades to the secondary process that includes a bioreactor retrofit to improve aeration efficiency, increase organic capacity and enhance nitrogen removal. Rob managed the peer review of the preliminary design report, a value engineering review at 60% design, and is currently managing the onsite construction management and inspection for the WPCF.

Design Manual, Environmental Protection Agency, Cincinnati, Ohio

Co-Author. Rob authored sections and reviewed drafts of other sections for new EPA Design Manual for Land Treatment of Municipal and Industrial Wastewater.

Compliance Plan, Bush Brothers and Company, Tennessee; Wastewater Land Application System

Project Engineer and Senior Reviewer. Rob evaluated the existing wastewater land application/reuse system for this leading bean processor and provided recommendations for upgrades. Rob also provided senior level document reviews.

Equalization/Settling Pond, Pump Station and Sprinkler Irrigation System Design and Construction Services, Pacific Coast Producers, Woodland, California

Project Manager. Rob designed a 400,000 gallon aerated, lined equalization and settling pond and a six mgd automated variable speed dual turbine pump station for a tomato cannery wastewater sprinkler system. He developed a sprinkler irrigation plan, distribution pipelines specifications and operations plan. Rob also managed the engineering and inspection services during construction and startup.

Evaluation of Groundwater Impacts and Pond Operation Alternatives, City of Woodland, California

Project Manager. In response to requests from the Regional Water Quality Control Board, Rob evaluated groundwater quality impacts from wastewater and biosolids ponds. He performed in-situ percolation rate studies, installed new monitoring wells, evaluated alternatives for salinity reduction in ponds and evaluated biosolids treatment alternatives.

Manual of Good Practice, California League of Food Processors, Sacramento, California

Author and Editor/Reviewer. Rob authored, reviewed and edited sections for new CLFP Manual of Good Practice for Land Application of Food Process/Rinse Water. He presented material to League members in a workshop forum.

Wastewater Master Plan, City of Lodi, California

Project Manager. Rob managed the project team and performed an evaluation of alternatives for increasing capacity and meeting new discharge requirements for the White Slough Wastewater Treatment Plant. The master plan included a detailed economic evaluation of alternatives and the development of recommendations for biosolids treatment, storage and seasonal land application to City-owned farmland.

Decentralized Wastewater Design and Permitting, SYSCO Foods, Pleasant Grove, California

Project Manager. Rob managed the design of a 10,000 gpd wastewater treatment and dispersal system for a private industrial facility. Wastewater system included a recirculating gravel filter, denitrification wetland and percolation ponds. He also prepared a Report of Waste Discharge and negotiated with the Regional Water Board for a site specific discharge permit.

Engineering Assistance and Aerated Pond Design, Recology, Dixon, California

Project Engineer. Rob designed a lined, aerated pond for leachate treatment from a food and green waste composting operation. He also managed an odor monitoring program and assisted in public presentations.

Wastewater System Facilities Planning and Conceptual Design, City of Vernonia, Oregon

Project Engineer. Rob evaluated treatment and alternatives and prepared a preliminary design and cost estimate for a town wastewater plant. The initial design included an innovative recirculating vertical flow wetland and intermittent polishing sand filter to provide advanced treatment performance with relatively passive operation.

Wastewater and Solids Compliance Monitoring and Reporting, Pacific Coast Producers, Woodland, California

Project Manager. Rob has provided ongoing monitoring, regulatory and technical assistance for land application of tomato cannery wastewater and solids since 2002.

Wastewater Treatment Design and Construction Services, City of Davis, California

Lead Project Engineer. The design of the secondary wastewater treatment facilities included aerated ponds, overland flow and general plant improvements. Rob coordinated project team activities and performed office engineering services during construction, including review of construction and materials submittals.

Wastewater Reuse Facilities Regulatory Assistance and Evaluation of Groundwater Impacts, Pacific Coast Producers, Woodland, California

Project Manager. Rob evaluated regulatory issues, prepared report of waste discharge and performed Regional Board negotiations for upgraded tomato cannery. He addressed salinity, BOD, solids and nitrogen loading issues to enable the upgraded cannery to begin full operation in 2002. Rob also developed an Internet-based groundwater database in conjunction with the City of Woodland to encompass all relevant groundwater monitoring wells in the area. He prepared several studies on impacts and pollution control measures.

Groundwater Impacts Evaluation and Regulatory Assistance, Sensient Deyhydrated Flavors, Livingston, California

Project Manager. Rob performed an analysis and prepared recommendations for operational procedures and equipment to maximize wastewater treatment and disposal capacity for an onion and garlic processing plant. He also prepared a new report of waste discharge and provided ongoing regulatory assistance and groundwater quality evaluation in several subsequent studies.

Land Application Studies, Reporting and Permitting Assistance, Unilever Bestfoods, Merced, California

Project Manager. Rob performed evaluations of process and rinse mud land application alternatives for several sites, including the City of Merced's Industrial Wastewater Reuse site. He assisted in Regional Board

negotiations and permitting for a new remote site and prepared reports for compliance with discharge requirements.

Land Application of Process Wastewater, Red Rock Specialty Cheese Company, Delta, Utah

Project Engineer. Rob analyzed data collected from soil and wastewater sampling programs to determine appropriate land application rates. He developed a detailed wastewater plan and facilities layout to ensure compliance with state DWQ regulations.

Cheese Wastewater Land Application and Treatment Recommendations, Dairy Farmers of America, Smithfield, Utah

Project Engineer. Rob developed a predesign report to resolve a notice of violation (NOV) and compliance order, including design criteria for enlarging the winter (non-irrigation) storage reservoir and a new irrigation site to prevent any further violations. He also provided recommendations to improve treatment effectiveness and to achieve compliance with potential nitrate and salinity limitations.

Cheese Processing Wastewater Conveyance and Land Application Alternatives Evaluation, Hilmar Cheese Company, Hilmar, California

Project Manager. Rob evaluated alternatives for 5 miles of pipeline conveyance and land application of 2 mgd of cheese processing wastewater. The project included evaluation of the land application area for groundwater anti-degradation policy compliance.

Reclaimed Water Pollutant Transport Modeling, Honolulu Board of Water Supply, Honolulu, Hawaii

Project Engineer. Rob developed a Hydrus model for vadose zone transport of potential pollutants from irrigation with reclaimed water. He calibrated the model to pilot study data. Nitrate and pharmaceutical impacts were found to not be significant, while long term chloride and TDS impact were found to be potentially significant.

Investigation of Wastewater Ponds Impacts, UC Davis, California

Project Manager. Rob performed a hydrogeologic investigation of groundwater impacts from unlined wastewater and sludge ponds at a recently closed wastewater treatment plant in accordance with a plan approved by the Regional Water Board. Trends and horizontal distribution of constituents of concern were evaluated using monitoring wells and supplemental borings. Groundwater quality impacts were shown to be localized and resolved by natural attenuation.

Land Application Evaluation, Golden State Vintners, Visalia, California

Project Engineer. Rob evaluated hydraulic loading rates, nitrogen loading rates and potential groundwater quality impacts for land application of winery stillage. He developed recommendations for wastewater conveyance and application improvements to increase capacity and reduce odors and developed groundwater monitoring system improvements.

Wastewater Facilities Planning, City of Davis, California

Project Manager. Rob managed the facilities planning for the upgrade and expansion of the Davis Water Pollution Control Plant. He evaluated natural and conventional treatment alternatives for increasing the plant's capacity from 5.3 to 7.5 mgd and improving plant reliability.

Overland Flow Treatment and Rapid Infiltration Disposal Systems, Clark County Sanitation District, Nevada

Project Engineer. Rob led the planning and design of overland flow facilities to treat 1.0 mgd of municipal wastewater. He also coordinated the field investigations and design for rapid infiltration facilities for 1.2 mgd.

Tomato Wastewater Land Treatment Reports and Design, Quality Assured Packing, Stockton, California

Project Manager. Rob prepared reports for the Regional Board and design of irrigation system for land treatment of tomato processing wastewater.

Commercial Site Decentralized Wastewater Preliminary Design, Malibu, California

Project Manager. Rob performed the site investigation and preliminary design for a 20,000 gpd advanced wastewater system for a Whole Foods Market Center to meet stringent discharge requirements in this environmentally sensitive area. A septic tank effluent pumping (STEP) collection system was planned to settle and convey wastewater from individual buildings to a main treatment system. The main treatment components included biotextile filters, denitrifying filters and ultraviolet disinfection. Subsurface drip irrigation and pressure dosed leach fields were planned for effluent dispersal. An interceptor drain and deep drain well were modeled to control shallow groundwater mounding in the vicinity of the site.

Onsite Wastewater Design Assistance and Plans Review for Shandon and Sunbeam Rest Stops, California Department of Transportation, Sacramento, California

Project Engineer. Rob provided design assistance and review of plans and specifications for wastewater systems for highway rest stops in San Luis Obispo and Imperial Counties. The wastewater systems included septic tank effluent pumping systems, recirculating gravel filters and denitrification wetlands. Design flows were 6,000 to 10,000 gallons per day.

Wastewater Irrigation System Design, City of Oakhurst, California

Project Engineer. Rob designed sprinkler irrigation and runoff control systems for treated wastewater.

Co-Composting Feasibility Study, City of Fresno, California

Project Manager. Rob managed the project team and provided technical review for feasibility study of biosolids co-composting. The project included a detailed siting study, air pollution and odor modeling, regulatory agency interaction and detailed economic analysis.

Biosolids Program, City of Santa Rosa, California

Lead Project Engineer. Rob managed the project team and performed an evaluation of alternatives for increasing capacity, optimizing existing facilities and meeting potential future biosolids regulations for the Laguna Subregional Water Reclamation Facility. The Phase II program included detailed review of thickening, digestion, dewatering, composting, storage, land application and disposal facilities and operations. Rob developed an economic optimization model to incorporate the effects of improvements on downstream processes.

Groundwater

Indirect Potable Recharge and Groundwater Recharge Study, Marine Corps Base Camp Pendleton, Oceanside, California

Project Engineer. Rob assisted in the investigation of 8 indirect potable reuse alternatives to increase water supply on Camp Pendleton by up to approximately 3000 acre-feet per year. Rob also provided senior level reviews and quality assurance.

Phase II Wellfield Optimization Study, City of Modesto, California

Project Manager. Rob is leading the development of a geodatabase that will help manage municipal water supply wells and related information in the Modesto groundwater sub-basin. BC compiled well, survey, water level, water quality, maintenance, and other project data from local and state sources into a standardized structure. The database, custom management algorithms, and GIS-based user interface will help provide efficient wellfield management, protect water quality, and allow easier data reporting to the State of California.

Salt and Nutrient Management Plan, Marine Corps Base Camp Pendleton, Oceanside, California

Project Engineer. Rob led the evaluation of groundwater salt and nutrient loadings and implementation measures to improve groundwater quality for two of the major water supply basins for the base. This included an evaluation of recycled water impacts, upstream improvements and artificial recharge projects.

Yolo County Integrated Regional Water Management Plan, Water Resources Association of Yolo County, Woodland, California.

Project Manager. Rob developed objectives, programs and actions, including agricultural drain water management, tailwater recovery, a mercury TMDL, groundwater nitrate reduction, groundwater enhancement,

surface water monitoring and subsidence monitoring. He participated in public outreach and prioritization meetings.

Groundwater Management Plan, City of Davis and UC Davis, California

Project Manager. Rob coordinated the preparation of a groundwater management plan conforming to California Department of Water Resources guidelines. Plan development included extensive stakeholder participation and integration of results from numerous previous studies. He developed qualitative and quantitative basin management objectives and a monitoring program to protect groundwater resources.

Phase I and II Deep Aquifer Studies, City of Davis and UC Davis, California

Project Manager. Rob performed a geological investigation, multiple aquifer drawdown and recovery tests, isotope analysis and related investigations to determine the water supply capacity, characteristics and extents of the deep aquifer zone near Davis. The deep aquifer zone was evaluated as a higher quality water supply to replace a portion of production from lower quality intermediate zone wells.

Aquifer Testing, Conaway Conservancy Group, Davis, California

Project Manager. Rob managed a study to determine agricultural production well pumping impacts on seepage from the Sacramento River. He supervised monitoring well installations, pumping tests and water quality sampling.

Expert Witness Services, Westec Farms, West Sacramento, California

Expert Witness. Rob performed an evaluation of impacts to shallow groundwater levels from drainage systems operations. He evaluated depositions and provided recommendations that were used in reaching an out-of-court settlement.

Groundwater Investigation and Protection Plan, Tahoe City Public Utility District, California

Project Engineer. This groundwater investigation and protection plan was partially funded as a demonstration Environmental Protection Agency wellhead protection program. Rob evaluated existing groundwater resources, developed computerized base mapping and linked databases, inventoried contamination sources and delineated wellhead protection zones.

Groundwater Recharge and Water Budgeting, Conaway Conservancy Group, Woodland, California

Project Manager. Rob coordinated recharge and monitoring activities for a seasonal groundwater recharge project on approximately 8,000 acres of farmland near the Sacramento River. The project involved the setup and gathering of hydrologic data for a water budget for the entire area along with a detailed water budget for specific fields. Hydrologic parameters monitored included initial soil moisture, river diversions, creek flows, evaporation, precipitation, ponding depth and groundwater level monitoring. Large scale basin infiltration tests were also performed at the conclusion of the recharge program.

In-lieu Recharge Evaluation and Planning, Glenn County, California

Project Engineer. BC is investigating the feasibility of importing excess surface water from Glenn-Colusa Irrigation District's contractual water supplies or flood flows from the Sacramento River to recharge this area, decreasing groundwater pumping in most years. This project has the potential to provide significant benefits in the drier years since recharged water would be relied upon, leaving water in the Sacramento. Rob is evaluating surface water delivery alternatives to users in the in-lieu recharge area. (24518; June 2013 est; \$191K)

Future Water Supply Study, City of Davis and UC Davis, California

Project Manager. Rob performed demand projections, evaluated water quality and capacity of alternatives including intermediate depth wells with wellhead treatment, deep wells and treated surface water. He recommended the short term replacement of aging intermediate wells with deep wells and long term measures to bring in treated surface water.

Memberships

Groundwater Resources Association

American Society of Agricultural and Biological Engineers

Water Environment Federation



Publications and Presentations

1. "Natural Systems for Wastewater Treatment," WEF Manual of Practice FD-16., 3rd Edition, coauthor. Water Environment Federation, Alexandria, Virginia. 2010.
2. "Design of Municipal Wastewater Treatment Plants," WEF Manual of Practice 8, 5th Edition, coauthor. Water Environment Federation, Alexandria, Virginia. October 2009.
3. "Process Design Manual - Land Treatment of Municipal Wastewater Effluents," EPA/625/R-06/016, coauthor. Office of Research and Development, USEPA, Cincinnati, Ohio. September 2006.
4. "Fate of Nitrogen for Subsurface Drip Dispersal of Effluent from Small Wastewater Systems," lead author. Journal of Contaminant Hydrology. August 2011.
5. "The Future of Rapid Infiltration," coauthor. Presented at Idaho Water Reuse Conference, Boise, Idaho. May 2011.
6. "Fate of BOD and Nitrogen in Land Application of Food Processing Wastewater," coauthor. Presented at the ASABE Annual Meeting Proceedings, June 2009.
7. "Water Recycling in Small Communities," coauthor. Presented at WEFTEC Annual Conference, Chicago, October 2008.
8. "Groundwater Nitrate Impacts from Land Application of Food Processing Wastewater," Presented at the Groundwater Resources Association Sixth Symposium on Groundwater Contaminants, Fresno, California. November 2002.
9. "Hydrological Impacts of a California Water Transfer," coauthor, Management of Irrigation and Drainage Systems, ASCE. July 1993.
10. "Water Transfers and Conjunctive Use in Northern California," coauthor. Presented at the American Water Resources Association 29th Annual Conference, September 1993.
11. "Odor Management for Land Application of Food Processing Wastewater," coauthor. Presented at the Sixth International Symposium on Agricultural and Food Processing Wastes. December 1990.
12. "Constructed Wetlands at Mesquite, Nevada," coauthor, ASCE. July 1991.
13. Co-authored "Santa Rosa Fine Tunes its Flexible Biosolids Program". Presented at the Water Environment Federation National Residuals and Biosolids Conference. February 2004.
14. "Design and Management Considerations for Drip Irrigation with High Solids Content Source Water," ASCE. May 1989.

ARTHUR J. O'BRIEN, P.E.
Principal Engineer

Arthur J. O'Brien is a civil engineer with over 37 years of civil engineering planning, design, and construction experience. Art has 25 years of proven management, leadership, and supervisory skills through progressively challenging promotions. He has 13 years as the City of Roseville Wastewater Utility Manager, providing fiscal, project, and staff leadership, preparing rate and connection fee studies for a \$25 million per year enterprise fund \$250 million capital program, and preparing training programs to improve delivery of services to public agencies. Art has prepared calculations, plans, and specifications for wide variety of civil engineering projects, as well as project and construction management and field oversight for all types of civil projects. He is a regular speaker and presenter at professional society meetings and community workshops, such as WEFTEC, California Water Environment Federation, and Central Valley Clean Water Association.

EDUCATION M.S., Civil and Environmental Engineering, 1979, Utah State University
B.S., Civil and Environmental Engineering, 1977, Utah State University

REPRESENTATIVE PROJECT EXPERIENCE **WASTEWATER UTILITY MANAGER, CITY OF ROSEVILLE, ENVIRONMENTAL UTILITIES DEPARTMENT**

As the Wastewater and Recycled Water Utility Manager for the City of Roseville, Art was responsible for all aspects of the utility infrastructure, including planning, maintenance, and construction, with an annual operations budget of more than \$25 million. This utility has over 500 miles of sewer pipelines, 15 neighborhood lift stations, and the Dry Creek Wastewater Treatment Plant (DCWWTP), along with the Pleasant Grove Wastewater Treatment plant (fully automated, tertiary treatment plants with 18 mgd and 12 mgd of capacity). As the Wastewater Utility Manager, he was responsible for production and delivery of Recycled Water. Art provided updates to the Roseville Public Utility Commission on a regular basis.

ROSEVILLE UTILITY RATE STUDIES

As the Wastewater and Recycled Water Utility Manager, Art was responsible to keep the utility enterprise fund in a healthy and sound financial status. He oversaw more than 4 rate studies in his 13-year career with the City of Roseville. Each rate study addressed projections in capital projects, labor costs, materials costs, indirect costs, and emergency fund set asides (known as the Rehabilitation Fund). Art oversaw the transfers of operations funds to the Rehabilitation (Rehab) Fund and actively pursued rehab projects. When Art retired from the City of Roseville, the Operations Fund reserves were at the highest level in the history of the fund and the Rehab Fund was established for future infrastructure projects for the next 20 years.



CITY OF BRENTWOOD

As Principal in Charge and Project Manager of permit support activities and the Recycled Water Feasibility Study for the City of Brentwood, he is serving the City of Brentwood with their entire compliance program with the Regional Water Board. This includes negotiation with the Board staff for revised Chloride effluent limits, preparation of the Report of Waste Discharge, preparation of the permit-required special studies and negotiation of permit limits in the anticipated permit. His role managing the consultant team for the Recycled Water (RW) Feasibility Study, Art is overseeing an analysis to expand the RW use in the City and evaluation of alternative water supplies to facilitate compliance with permit requirements. All the alternatives will consider cost, both capital and operational. Alternatives being considered include blending of surface water supplies with groundwater supplies, reduction on reliance on water softeners, and reduced effluent discharge to Marsh Creek. The study will provide a key opportunity to input to the rate studies as the City looks for solutions to the permit challenges.

CITY OF IONE

As Principal Engineer for RBI, Art has served as the City of Ione's wastewater program manager. In this role, he oversaw the project team as it developed a rate study comparing a private company development of the Wastewater Plant, to a City-Funded State Revolving Fund Project. Rate analyses included capital and operational costs were projected for 30 years. Art also managed the development of the City's Seepage Discharge Compliance Plan required by the Central Valley Regional Water Quality Control Board and has developed their capital project to meet the requirement of the Regional Water Board.

CITY OF DAVIS

As Principal Engineer for RBI, Art is providing staff augmentation for the City's \$90 million Wastewater Treatment Plant (WWTP) expansion. The City is under a compliance schedule from the Regional Water Quality Control Board to have the WWTP expansion constructed and operational by 2017. In his role as staff augmentation, Art attends workshops presented by the consultant team and comments on the direction of the project. He also reviews consultant work products including technical memorandums, drawings, specifications, and procurement documents. Art's experience has been vital as the City moves forward toward this goal.

PLEASANT GROVE WASTEWATER TREATMENT PLANT PROJECT

Project Manager of the Pleasant Grove Wastewater Treatment Plant (PGWWTP), a \$120 million capital improvement project, among the largest local-government funded projects in Northern California at the time. The PGWWTP is a full tertiary treatment plant designed to provide treatment capacity for the South Placer region through 2012. Provided leadership and management for the entire project team of consultants, staff, and contractors during implementation of the EIR, design, construction, and startup.

DRY CREEK WASTEWATER TREATMENT PLANT NPDES PERMIT RENEWAL AND PLEASANT GROVE WASTEWATER TREATMENT PLANT PERMIT

Project Manager for the 2000 renewal of the Dry Creek Wastewater Treatment Plant NPDES permit and Project Manager to obtain the initial NPDES permit for the Pleasant Grove Wastewater Treatment Plant. Project Manager for the 2008 renewals of the DCWWTP and PGWWTP NPDES permits. This effort required compilation of 3 years of laboratory data, review and comment on the administrative drafts of the permits, review of the tentative orders, and presentation at the Regional Water Quality Control Board hearing for adoption of the permits.

BASIN PLAN AMENDMENT TO MODIFY THE SACRAMENTO AND SAN JOAQUIN RIVER WATER QUALITY CONTROL PLAN

Project Manager for a Basin Plan Amendment to modify the Sacramento and San Joaquin Rivers Water Quality Control Plan (Basin Plan) for pH and Turbidity. This involved organizing approximately 10 local jurisdictions with funding through a Memorandum of Understanding to accomplish the work for approval of the Basin Plan Amendment at the Regional Water Quality Control Board.

SOUTH PLACER WASTEWATER AUTHORITY

Program Manager for the South Placer Wastewater Authority. This authority serves as the funding body for implementation of the capital project plan outlined in the WW Master Plan finalized by the City in 1996. As Program Manager, responsible for projects totaling \$250 million and overseeing project managers and other City staff as these projects are implemented. Provided reports and gave presentations to the Authority on the progress of this capital program.

CITY OF ROSEVILLE SEWER SYSTEM MANAGEMENT PLAN

Project Manager for the preparation of the City's Sewer System Management Plan (SSMP), a comprehensive plan required under California's Sanitary Sewer Overflow (SSO) regulations. The SSMP lists all training required for staff and emergency response procedures, along with documentation and reporting of any SSOs.

CITY OF ROSEVILLE – PURIFIED WATER

Project Manager for evaluating the feasibility of purified water production to augment potable water supplies with indirect potable water reuse with injection of purified water into the groundwater basin. Purified water could be produced by treating recycled water with reverse osmosis and advanced oxidation. This project was determined to be feasible, but not yet cost-effective.

CITY OF ROSEVILLE – WASTEWATER UTILITY MANAGER

As Wastewater Utility Manager for the City of Roseville, Mr. O'Brien served as Principal-in-Charge on many Dry Creek and Pleasant Grove wastewater treatment plant projects. The following are a few representative projects.

PLEASANT GROVE TRUNK SEWER PROJECT

Pleasant Grove Trunk sewer, a 78-inch-diameter concrete gravity pipeline to serve Northwest Roseville, the Sunset Industrial Area, and Whitney Ranch development in Rocklin.

KASEBERG TRUNK SEWER PROJECT

Kaseberg Trunk sewer, a 24- to 36-inch-diameter vitrified clay pipe (VCP) that provided a gravity flow connection to the Pleasant Grove Trunk Sewer.

DCWWTP COOLING UNITS PROJECT

Design and construction of cooling units at the DCWWTP, which discharges into Dry Creek—a well-known salmon fishery. The cooling units were designed to lower the discharge temperature by 5EF to facilitate compliance with the discharge permit and maintain the health of the salmon fishery.

ULTRAVIOLET DISINFECTION SYSTEMS AT DCWWTP AND PGWWTP

Planning, design and construction of ultraviolet (UV) disinfection systems at both DCWWTP and PGWWTP. The UV system at DCWWTP replaced an aging gaseous chlorine system that presented a potential threat to workers and the community. Both UV systems were designed for ease of maintenance by using a proprietary lamp-sleeve cleaning system so that the lamp-sleeves do not have to be dipped in an acid solution for cleaning. Both systems provide compliance with the trihalomethanes in the plants' discharge permits

PGWWTP UPGRADE PROJECT

Planning, design and construction of upgrades to the PGWWTP. Constructed upgrades include increases to aeration capacity in the Orbal[®] Oxidation Ditches and planned upgrades, which include the

addition of primary clarifiers, anaerobic digestion with associated energy capture and generation, additional secondary clarifiers, and oxidation ditches for an ultimate capacity of 24 mgd.

DCWWTP GREASE AND FOOD WASTE RECEIVING STATION PROJECT

Conducted a feasibility study for a grease and food waste receiving station at the DCWWTP. This study determined that a receiving station would have a payback period of less than 20 years, considering the capital and operational costs. The facility would also reduce food waste in the landfill, thus increasing the diversion rates.

DCWWTP EXPANSION REQUIREMENTS PROJECT

Conducted an assessment of expansion requirements at the DCWWTP to meet the wastewater disposal needs through 2050. This assessment determined that existing facilities can be cost-effectively retrofitted to meet the capacity through 2030 and a complete upgrade will be needed beyond 2030 to 2050.

CITY OF ROSEVILLE MAINTENANCE MANAGEMENT SYSTEM

Project sponsor for a complete city-wide enterprise installation of a maintenance management system to manage the City's \$5 billion in assets. This project required developing interfaces with the City's financial, purchasing, and time-keeping systems, along with the development of new processes to be used by the new Maximo® system.

CH2M HILL, SACRAMENTO, CA

Prior to joining the City of Roseville, Art worked for CH2M HILL for 21 years, starting as a Project Engineer in their Boise, Idaho, office. Art served in progressively challenging roles at CH2M HILL offices located in Seattle, WA; Milwaukee, WI; Reston, VA, and Sacramento, CA. In 1995, while serving in the Sacramento office, he was promoted to the Environmental Business Group Manager with responsibilities for 80 Northern California staff members to manage and direct the preparation of plans and programs for the environmental business. In 1997, Art was promoted to Vice President and manager of the 120-person Sacramento office of CH2MHILL. In this role, he was responsible for the leadership and direction of staff in three business groups, leading staff meetings to inform staff of key opportunities and challenges facing both the Sacramento office and the entire company.

Art served as a Solid Waste Engineer for 10 years while working for CH2M HILL. In this role, he was Chief Engineer or Project Manager for solid waste projects all over the country.

COUNTY OF SANTA BARBARA, CA

This project evaluated the feasibility of closing a remote, small landfill

and replacing the landfill operations with a transfer station. The County did not want to continue to operate a small remote landfill with a large regional landfill about 20 miles south. The feasibility study included preliminary layout of the transfer station and estimated cost to construct and operate the station along with the cost to close and maintain the closure of the remote landfill. Art worked closely with Greg Clumpner, Economist with CH2M HILL, to develop impacts to the solid waste rates as the County considered the landfill closure and development of the transfer station.

**PROFESSIONAL
AFFILIATIONS /
CERTIFICATIONS**

Professional Engineer: California (C54457), Washington (19954),
and Virginia (17041)
American Society of Civil Engineers (ASCE)
American Public Works Association (APWA)
Water Environment Federation (WEF)
California Water Environment Association (CWEA)
Central Valley Clean Water Association (CVCWA)

Hilary Armstrong Reinhard, PE

Senior Engineer

Education

- ✓ Masters of Business Administration, Emphasis in Organization Behavior & Statistics, University of California, Davis
- ✓ B.S. Agricultural Engineering, California Polytechnic State University, San Luis Obispo

Registration/Certifications

- ✓ Civil Engineer, California #64379

Affiliations

- ✓ Mid Upper Sacramento River Flood Management Plan Advisory Committee
- ✓ Northern California Water Association Water Leaders Class

Areas of Expertise

- ✓ Reports of Waste Discharge
- ✓ Groundwater Quality
- ✓ Permitting
- ✓ Storm Water Pollution Prevention Plans

Professional Summary

Hilary Armstrong Reinhard is a senior engineer with over fifteen years of engineering experience. She has worked with food processors, wineries and dairies on developing nutrient management plans, groundwater monitoring plans and negotiations with the Central Valley Regional Water Quality Control Board (RWQCB). Additionally, she has worked with irrigation districts on water use efficiency studies and groundwater studies, and is knowledgeable about conveyance systems and irrigation district practices. Having been raised in a farming family, she is also familiar with farming practices.

Relevant Experience

Groundwater Monitoring, Confidential Client, California, Project Engineer –

Ms. Reinhard performed a statistical analysis of groundwater quality results from the facility's existing groundwater monitoring wells, preparing a new groundwater monitoring plan, analyzing the facility's salinity production including identifying salinity sources, and developing a plan to reduce wastewater salt content. In addition, she presented information to the RWQCB on the client's behalf and worked with the company's employees to implement an extensive monitoring program for the facility.

Reports of Waste Discharge, Various Small Wineries, California, Project Manager –

Ms. Reinhard prepared reports of waste discharge for small wineries that have their wastewater trucked to East Bay Municipal Utility District's wastewater treatment facility.

Storm Water Pollution Prevention Plan, Various Wineries, California, Project Manager –

Ms. Reinhard was responsible for the preparation of Storm Water Pollution Prevention Plans (SWPPP) for wineries, and for a creek bank restoration project.

Groundwater Limitations Compliance Assessment Plan, Confidential Food Processor Client, California, Project Engineer –

Ms. Reinhard analyzed groundwater monitoring data from a food processor and developed a statistical approach to determining if future groundwater sample results demonstrate a compliance with limitations imposed by RWQCB's waste discharge requirements (WDR). Analysis included developing background groundwater quality information, determining appropriate confidence intervals, and preparing a report to summarize the findings.

Water Balance and Sustainability Analysis, Dunnigan Water District, Yolo County, California, Project Engineer –

Ms. Reinhard performed an analysis of the groundwater conditions in the area of Dunnigan Water District. This analysis utilized historical weather conditions, cropping patterns, surface water deliveries, groundwater level hydrographs and aquifer information compiled through well logs to help determine how historical conditions affected groundwater and the modelled future water scenarios.

Groundwater Assessment Report, Kaweah Basin Water Quality Association, Tulare County, California, Project Engineer –

Ms. Reinhard is working on an ongoing study that includes a comprehensive collection and review of existing groundwater data publicly available from various agencies. Groundwater quality and gradient information was collected to determine locations of higher concentrations and was compared to factors including land

use designations, soil types, and aquifer information to determine groundwater high vulnerability areas.

Wastewater Storage Pond Assessment, JD Heiskell, Tulare County, California, Project Manager – Ms. Reinhard is working on an ongoing study that includes the oversight of soil sample collection and review of results to determine the impacts of wastewater storage in unlined ponds located on the client's property.