

Water Resource Solutions

In Partnership with Nature

- **Watershed Management & Planning / Stormwater Quality**
 - **River Engineering**
 - **Land Development Infrastructure Planning**
- **Wastewater / Water Reclamation / Potable Water**
 - **Lake Systems / Water Features / Pools**
 - **Wetland & Stream Restoration**

Mission Statement

Water resource solutions that deliver
value-added results through
innovation & creativity.

Dedication to customer satisfaction,
professionalism and protection of Earth's
greatest natural resource ... *water.*



Introduction to PACE

“PACE's environmentally conscious & hydraulically innovative designs enabled us to achieve our objectives when faced with flood control and budgetary constraints...meeting our corporate & project mission to provide development in partnership with nature.”

Westinghouse Desert Communities,
Bighorn Development,
Palm Desert, California



PACE is a water resources engineering design and consulting company formed in 1987. PACE specializes in all water resources areas such as:

- Watershed Management & Planning / Stormwater Quality
- River Engineering
- Land Development Infrastructure Planning
- Wastewater / Water Reclamation / Potable Water
- Lake Systems / Water Features / Pools
- Wetland and Stream Restoration



Respect for the Environment

PACE offers clients proven and creative solutions that add value to projects while remaining sensitive to the environment and our natural resources, namely water. Water is an important component to every facet of life on Earth. With development growing at an ever increasing rate, water resources are spreading thin. PACE recognizes the threat this poses and has modeled its business practices after providing clients water resource solutions that preserve and protect our water supplies.

Creative and Innovative Solutions

We focus on providing advanced civil engineering services through the utilization of cutting-edge technology and proven practices. Our solutions enhance the value of your projects and respect the environment by treating water as a valuable resource and asset. PACE strives to think beyond the limits of standard civil engineering practice. We are committed to finding the right solutions for your projects: high quality, efficient water resource systems.

Our goal is to provide engineering services that are right for the client and right for the environment. Our focus on preserving the environment results in natural looking solutions improving aesthetic quality and adding value to your projects.

Design and Construction Experience

In addition to design and consulting, PACE is also experienced with design/build services. Our experience with constructing our designs has enabled us to develop more dependable, cost effective solutions for our clients. Through our design/build experience we are able to provide accurate cost estimates during conceptual and preliminary design phases to assist the project team in developing construction budgets. Our design/build experience also allows us to deliver innovative turnkey solutions that create valuable cost savings while maximizing value to your projects.

PACE's Commitment to Excellence

“Our skilled team of water resource specialists is devoted to meeting your project needs in a timely, cost effective & environmentally sensitive manner.”

Mark E. Krebs, P.E.
- President -



Our clients benefit from a well-integrated team of professionals with significant expertise in management and exceptional knowledge in each required technical discipline. Our available office staff provides the best opportunity for timely preparation of project plans and specifications, including CAD drawings. The creative talents and technical skills of our staff enable the company to offer a wide range of cost-effective services to clients. The following outlines just a few of the benefits of selecting PACE:

Professional Excellence

We can offer clients the confidence of drawing on a 20-year successful track record. Our design experience draws from an extensive background of innovative, award winning projects. Our responsible in-house staff of professionals, and our pledge to work “in partnership with nature” is why we have been selected by many state and municipal clients to help plan, design, and execute their projects. Our design professionals have been responsible for numerous hydrologic and hydraulic analyses, water, wastewater, and reclaimed water facility construction document projects for federal, state, local and private owners.

Understanding Project Requirements

We understand the need for a cost-effective, sensitive, constructible solution that can be completed within tight schedule constraints. PACE possesses the unique combination of being extremely familiar with the project requirements due to our role as Civil Engineering Consultant, and the distinction of being associated with numerous high profile projects. Our innovative and nature-conscious designs have made us a well-respected industry pioneer. Our long-standing record of successful projects makes us perfectly poised to provide clients with responsive service.

Communication

To ensure that our clients are fully satisfied with our performance throughout their projects, we have made active communication a hallmark of our approach. Emphasis on communication positively affects the interaction among the consultant's various design professionals, disciplines, and subconsultants. Of even greater importance, however, is the establishment of open communication between designated Client staff and the Pacific Project Manager. Communication is accomplished through regularly scheduled team meetings and with project memoranda.

Public Awareness

PACE principals and staff are experienced in the administration of public relations issues and have been involved in public and civil presentations. PACE desires to work closely with the engineering perspective and public interests to present the best possible design solutions. We work to ensure our projects' long-term viability while protecting the environment, local culture, and character of the site.

Team Qualifications

Johan Perslow, P.E., Chairman/Senior Consultant

EXPERIENCE

30+ years
Created Pacific in 1974

REGISTRATIONS

Professional Engineer:
AZ, CA, CO, NV

Over the last 30 years, Mr. Perslow has been the principal designer, consultant and construction manager for more than 700 projects, including lake and pumping systems, numerous state-of-the-art water resource management systems, wastewater-effluent reuse systems, irrigation-optimization systems and tertiary water reclamation facilities. As PACE's Senior Consultant, Principal and Chairman, Mr. Perslow has been at the cutting edge of developing and applying new technology to solve commonplace and unique problems.



Cory Severson, P.E., CEO/Senior Consultant

EXPERIENCE

25+ years
Joined Pacific in 1985

REGISTRATIONS

Professional Engineer:
AZ, CA, CO, HI, NV, UT

Mr. Severson's wide range of engineering applications include site grading, drainage studies, flood-control routing, subdivision/public-works improvements, lake and pond systems, utility relocation/coordination, mechanical engineering for pumping systems, hydraulic design for channels and pipelines, as well as structural design in wood, masonry, concrete and steel. His deep involvement with both design and construction phases of more than 150 projects has enabled him to develop the unique, analytical, practical and conceptual capabilities that have helped make PACE internationally renowned for aesthetic and practical designs that really work.



Mark Krebs, P.E., President

EXPERIENCE

20+ years
Joined Pacific in 1989

REGISTRATIONS

Professional Engineer:
AZ, CA, CO, KY, NV, NM, UT

Mr. Krebs' project design and construction experience includes all phases of infrastructure, grading, drainage, roadway, water, sewer, reclaimed water, storage, distribution, wetland evaluation and mitigation. His water resources expertise includes hydrologic, sediment transport and hydraulic computer modeling analyses and design for many private and municipal FEMA flood-control projects. In addition to the responsibility of being an officer of the company and President of PACE, Mr. Krebs is the Principal/Sr. Project Manager and the lead design engineer on numerous water resource projects.



Bruce Phillips, M.S., P.E., Sr. Vice President - Stormwater Management Division

EXPERIENCE

20+ years
Joined Pacific in 2002

REGISTRATIONS

Professional Engineer: AZ, CA

Mr. Phillips' areas of expertise include sediment transport, regional flood control facility plans, watershed hydrology analysis, stormwater quality assessment studies, detailed hydraulic structure analysis and design, urban drainage facility master plan development, floodplain analysis, and watershed modeling. He has significant specialized experience in river engineering and geomorphic studies, including assessment and design of river/stream restoration programs that incorporate unique biological control measures as well as creative stabilization techniques.



James Matthews, P.E., Sr. Vice President - Environmental Water Division

EXPERIENCE

15+ years
Joined Pacific in 1994

REGISTRATIONS

Professional Engineer: AZ, CA
Wastewater Treatment Operator,
Certified: AZ

Mr. Matthews' areas of expertise include hydraulics, water and wastewater treatment, pump station design and system automation. Mr. Matthews' experience includes design and construction of water and wastewater treatment facilities, pump stations, potable water and storage systems; design and implementation of computer controlled (SCADA) electric, hydraulic, and pneumatic control systems.



Sonny Sim, P.E., Vice President - Recreational Water Division

EXPERIENCE

10+ years
Joined Pacific in 1996

REGISTRATIONS

Professional Engineer:
AZ, CA, OR

Mr. Sim's project design and construction experience includes site grading, pool systems, lake and pond systems, the mechanical engineering of pump systems, and hydraulic design for pipelines. Mr. Sim is responsible for the overall project management, design and construction support of projects pertaining to lake systems and the necessary pump stations and water features.



Team Qualifications

Deborah de Chambeau, M.S., P.E., Project Manager - Stormwater Management Division

EXPERIENCE

11+ years
Joined Pacific in 2006

REGISTRATIONS

Professional Engineer: CA

Ms. de Chambeau's areas of expertise include watershed hydrology analysis, stormwater quality assessment studies, detailed hydraulic structure analysis and design, urban drainage facility master plan development, floodplain analysis, watershed modeling, and regional flood control facility plans. Ms. de Chambeau has extensive experience with various local, regional, and federal guidelines related to stormwater and floodplain management.



Tony Howze, Manager - GIS

EXPERIENCE

9+ years
Joined Pacific in 2005

Mr. Howze's areas of expertise include geospatial hydrologic/hydraulic modeling, analytical model building, database design/management, and high quality cartography. His experience also includes incorporating technologically advanced solutions to large and small land development projects specializing in water resources and planning. Mr. Howze has extensive knowledge in the ESRI product line, including ArcInfo, 3D Analyst, Spatial Analyst, HEC-GeoRAS, HEC-GeoHMS, ArcHydro, and WMS.



Derek Karimoto, P.E., V.P., Project Manager - Stormwater Management Division

EXPERIENCE

20+ years
Joined Pacific in 1993

REGISTRATIONS

Professional Engineer: AZ, CA

Mr. Karimoto's expertise includes hydraulic and hydrology analysis, computer modeling, grading and infrastructure plans, budgetary, and land sale and cost estimating. Mr. Karimoto is involved with water resources, master plan drainage studies, flood-control retention basin coordination, site grading, highway design, and golf course development.



Ronald J. Rovanseck, Ph.D., P.E., Project Manager - Stormwater Management Division

EXPERIENCE

11+ years
Joined Pacific in 2001

REGISTRATIONS

Professional Engineer: CA, UT

Mr. Rovanseck's expertise includes work with pollution control technologies for combined sewers, non-point source pollution control, and the hydrology of both urban and undeveloped areas. Other experience includes working as a consulting engineer and hydrologist on a variety of water resources projects, and researching stormwater BMP design as a visiting scientist with USEPA.



Jonis C. Smith, M.S., P.E., Project Manager - Stormwater Management Division

EXPERIENCE

10+ years
Joined Pacific in 2005

REGISTRATION

Professional Engineer: CA

With both a Masters and Bachelors degree in Civil Engineering, Mr. Smith is proficient in managing the design and construction of flood control and water resources projects. He also has extensive knowledge and experience in the design and construction of lakes and water features. He has extensive experience in producing improvement plans, performing watershed studies, preparing FEMA analyses and reports and acquiring jurisdictional agency permits. Other responsibilities include design and engineering of river and flood control conveyance facilities including lake and water features, and lake restoration.



Corey Comstock, Project Manager - Recreational Water Division

EXPERIENCE

25+ years
Joined Pacific in 2006

Mr. Comstock has been designing, illustrating and animating with computers and managing projects for over two decades. In engineering, from design development through finished construction documents, and in entertainment, from visual development through finished productions, he uses computers, software and personal programming skills to perform complex simulations with experience in story and design of many scopes and a feel for appeal and entertainment. Mr. Comstock's expertise includes project management, engineering, 3D art and animation, design, illustration, programming, CAD operations, design drafting, and design development.



Team Qualifications

Zirang Song, M.S., P.E., Project Manager - Recreational Water Division

EXPERIENCE

20+ years
Joined Pacific in 2000

REGISTRATIONS

Professional Engineer: CA

Mr. Song's areas of expertise include lake system design, water feature / fountain design, hydraulic design for pipelines, pump station design and construction management. He is also experienced in construction support and coordination.



Duong Do, P.E., Project Manager - Environmental Water Division

EXPERIENCE

10+ years
Joined Pacific in 2000

REGISTRATION

Professional Engineer: AZ, CA

Mr. Do's areas of expertise include water and wastewater treatment processes and design, pump system analysis, and pipe hydraulics and distribution. His experience in environmental engineering includes soil and groundwater remediation, air quality sampling and analysis, regulatory permitting and hazardous waste management.



Andrew Komor, M.S., P.E., Project Manager - Environmental Water Division

EXPERIENCE

7+ years
Joined Pacific in 2000

REGISTRATION

Professional Engineer: CA

Mr. Komor's areas of expertise include wastewater treatment plant design, water treatment, mechanical pumping systems including storm, potable, and wastewater, wetlands treatment, hydrogeology, lake water quality, and AutoCAD. His responsibilities include field engineering/supervision and monitoring, particularly for SBR wastewater treatment facilities, pump stations, sewer lift stations, wetlands, and lake facilities.



Michael G. Krebs, MBA, P.E., Vice President - Environmental Water Division

EXPERIENCE

20+ years
Joined Pacific in 2004

REGISTRATIONS

Professional Engineer:
CA, IN, KY, VA

Mr. Krebs has over 25 years of engineering and project management experience. His areas of expertise include water and wastewater treatment, project/construction management, bidding, estimating and value engineering. Mr. Krebs' current responsibilities include managing design, QA/QC, constructability and value engineering reviews and construction oversight of all projects.



Paul Rydzynski, P.E., Project Manager - Environmental Water Division

EXPERIENCE

19+ years
Joined Pacific in 2003

REGISTRATIONS

Professional Engineer: CA
OSHA H&S Training
Pretreatment, U.S. EPA

Mr. Rydzynski's areas of expertise include wastewater, recycled water, stormwater and other public works infrastructure engineering, industrial waste treatment, pretreatment program management, waste minimization and recycling, stormwater and wastewater permitting and compliance, hazardous waste management and health and safety compliance. He is experienced in water resources and infrastructure engineering for municipalities, water agencies and commercial clients regulatory permitting and hazardous waste management.



Watershed Management & Planning



Talega Golf Club - San Clemente, CA



Integrated Aquascape Detention Basin - Bighorn - Palm Desert, CA

- ❖ stormwater facility planning & feasibility studies
- ❖ watershed & stream corridor planning
- ❖ regional flood protection systems
- ❖ floodplain / floodway delineation
- ❖ drainage / flood control master planning
- ❖ combined aquascape / flood control facilities
- ❖ watershed & hydrologic modeling / calibration
- ❖ FEMA studies / processing
- ❖ flood inundation studies / dam break analysis
- ❖ historical rainfall assessment
- ❖ urban drainage systems
- ❖ groundwater recharge
- ❖ detention / retention basins & dams
- ❖ flood streamflow forecasting



Excavation for soil cement bank protection



Backfilled soil cement



Bridgeport - Santa Clarita, CA

Trail & revegetation over soil cement bank protection

Stormwater Quality



Water Quality Filter - Bridgeport - Santa Clarita, CA

❖ urban drainage master planning

❖ BMP design & evaluation

❖ watershed assessment

❖ runoff water quality modeling

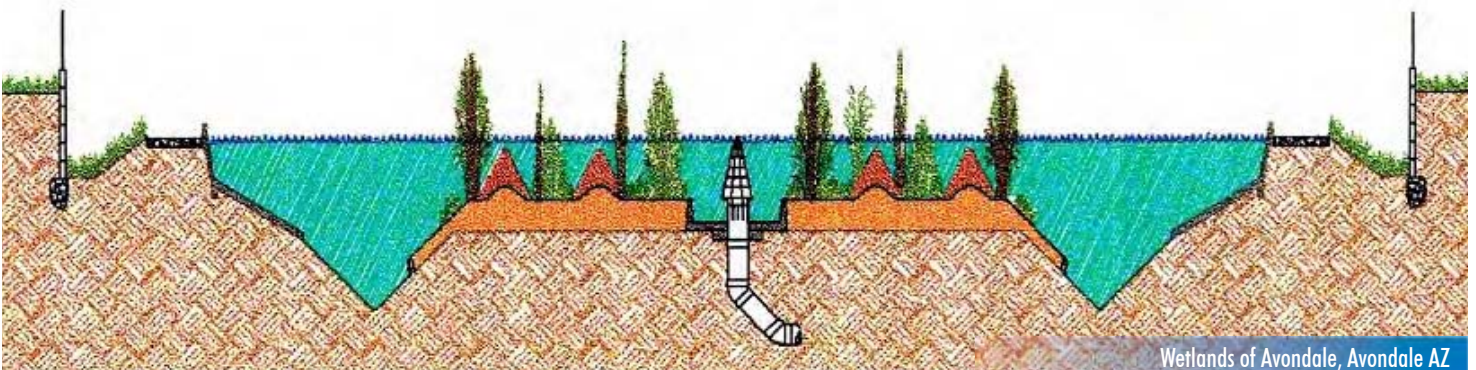


Wetlands of Avondale - Avondale, AZ

❖ water quality sampling, monitoring & evaluation

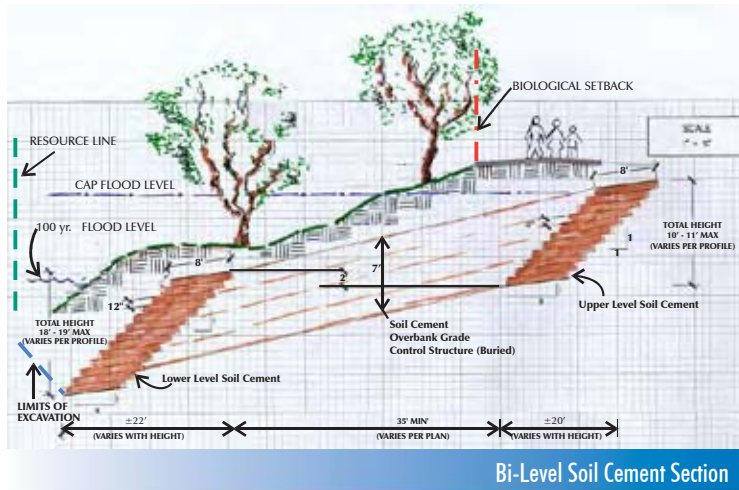
❖ stormwater impacts assessment

❖ NPDES compliance



Wetlands of Avondale, Avondale AZ

River Engineering



Bi-Level Soil Cement Section



Model Study - The Reserve - Palm Desert, CA



Santa Clara River Bank Protection - Santa Clarita, CA

- ❖ stream geomorphology
- ❖ fluvial systems
- ❖ stream bank / channel stabilization analysis
- ❖ bioengineering
- ❖ hydraulic & floodplain modeling
- ❖ streambed stabilization
- ❖ erosion control / bank protection / levees
- ❖ greenbelt & native channel flood conveyance
- ❖ physical modeling (hydraulic)
- ❖ sediment transport / fluvial systems
- ❖ flood control facility design

Land Development Infrastructure Planning



Arrowhead Ranch - Glendale, AZ



Avi Casino - Laughlin, NV



Whisper Rock - Scottsdale, AZ

- ❖ infrastructure feasibility studies & estimates
- ❖ storm drainage systems
- ❖ structural design
- ❖ hydraulic structures
- ❖ pipelines & channels
- ❖ dams & reservoirs
- ❖ mass grading & earth work balance
- ❖ roadway circulation
- ❖ bridges & culverts
- ❖ water network & distribution analysis
- ❖ water / wastewater systems transmission & distribution
- ❖ consumptive-use analysis
- ❖ utility coordination
- ❖ processing, scheduling & inspections

Wastewater / Water Reclamation / Potable Water



Water Reclamation Facility's Underground Treatment Process



Water Reclamation Facility in Palm Valley - Goodyear, AZ



Domestic Water System - Avi Casino - Laughlin, NV

- ❖ wastewater treatment facility design
- ❖ water/wastewater system upgrades and expansions, denitrification biological nutrient removal treatment process
- ❖ water & wastewater permitting
- ❖ sewage collection & reclaimed water distribution systems
- ❖ groundwater recharge
- ❖ EPA 503 bio-solids processing & dewatering
- ❖ groundwater & surface water treatment facility design
- ❖ domestic water supply, transmission & distribution
- ❖ domestic water storage tanks & pump stations
- ❖ well design & rehabilitation
- ❖ treatment facility operation & maintenance plans
- ❖ supervisory control & data acquisition (SCADA) systems

Lake Systems / Water Features / Pools



Alisanos - Tempe, AZ



The Point Hilton at Squaw Peak - Phoenix, AZ



Waterfront Park - Louisville, KY

- ❖ golf course lakes & water features
- ❖ natural & manmade lake & stream systems
- ❖ multi-purpose lake systems
- ❖ swimming & wading pools, spas
- ❖ formal & freeform water features
- ❖ entry / signature water features
- ❖ waterfalls & cascades
- ❖ water amusement parks / slides / rides
- ❖ boat ways / marinas / locks
- ❖ lake management & operations
- ❖ recirculation systems
- ❖ pump stations & pipelines
- ❖ aquascapes
- ❖ manmade rock designs
- ❖ fountains

Wetland & Stream Restoration



Oak Canyon Community Park - Agoura Hills, CA



Mountain House Creek Restoration - Tracy, CA



Whisper Rock - Scottsdale, AZ

- ❖ stream assessment & classification
- ❖ stream corridor planning
- ❖ wetlands enhancement / mitigation
- ❖ hydrologic & hydraulic modeling
- ❖ stream stability analyses
- ❖ riverine restoration
- ❖ bioengineering
- ❖ stream & wetland restoration plans
- ❖ monitoring
- ❖ experimental & scientific research projects
- ❖ regulatory permitting
- ❖ jurisdictional delineations
- ❖ impacts & avoidance analysis / planning

San Juan Creek Watershed & Fluvial Study - Orange County, California

PACE is currently providing a watershed hydrology analysis to generate the "ultimate unmitigated" hydrology for the San Juan Creek based upon hydrograph analysis. The ultimate land use condition includes the proposed Rancho Mission Viejo development. The mainstem hydrology will provide discharges at selected concentration points from the ocean outlet to Casper's Regional Park or additional points from the previously approved Rivertech study. The technical approach for the development of a regional watershed analysis of San Juan Creek from the headworks to the ocean outlet follows approved procedures in the County of Orange Hydrology Manual and Addendum No. 1 to the Hydrology Manual and criteria in the Orange County Flood Control District Design Manual. The County of Orange will review, and if acceptable, approve the proposed complex watershed work program and technical analysis criteria for items which may not be clearly defined in the Hydrology Manual. The watershed analysis includes major tributary sub-watersheds such as Trabuco and Oso Creeks and Canada Gobenadora. The final hydrology product will be used for future design of the mainstem improvements between the ocean and Casper's Regional Park.

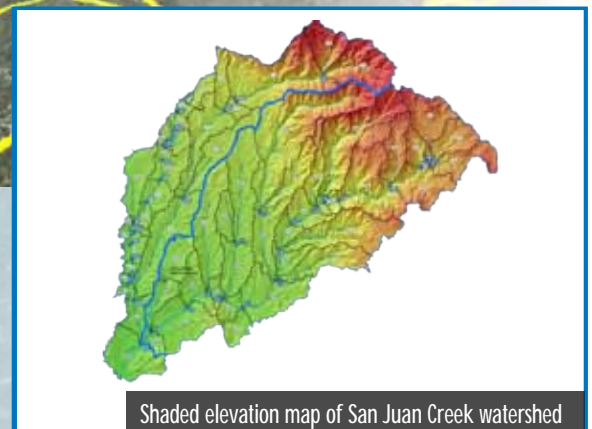
Additionally, PACE will be providing an analysis to determine the maximum hydraulic conveyance capacity of the existing mainstem channel system within the study area from the ocean outlet to La Novia bridge that may be limited by physical constraints or hydraulic controls. In addition, the analysis will also provide hydraulic characterization of the ultimate floodplain along the study reaches where fluvial analysis will be applied. This will be based on a new floodplain hydraulic analysis that will be performed from La Novia bridge upstream to Casper's Regional Park utilizing new 2005 topography provided by Rancho Mission Viejo. Hydraulic studies will utilize "as-built" plan information and the most current available topography. The floodplain analysis will be based on ultimate condition 100-year HC discharges and is not intended for use in establishing Federal Emergency Management Agency (FEMA) floodplain limits.

Project Elements:

- Largest Watershed Study in Orange County
- 175 Square Miles and 9 City Study Area
- Creation of Latest and Most Accurate Digital Data
- Comprehensive Hydrology Study
- Floodplain and Sediment Study



3D view of San Juan Creek watershed



Shaded elevation map of San Juan Creek watershed

CLIENT:
Rancho Mission Viejo, LLC

Bridgeport Lake - Valencia, California

Bridgeport Lake is a 15-acre residential lake providing both a visual and natural resource amenity to the adjacent Bridgeport development. With a tributary drainage area of 70 acres, Bridgeport Lake provides several urban stormwater pollution treatment and water quality maintenance. These features can be grouped by function: water quality, urban storm runoff control, and retention of runoff.

Water Quality (Lake):

- Biofilters: serve to strip water of nutrients that would promote algae growth and aid in the creation of aerobic conditions within the lake to prevent lake eutrophication.
- Aeration: introduces oxygen into the lake to increase dissolved oxygen levels and promotes natural convection of water to prevent stratification of lake water column through recirculation.
- Wetland Planter Areas: promote and enhance water quality through naturally occurring biological processes.

Urban Storm Runoff Controls (prior to entering lake):

- Water Quality Filters: collect initial runoff and retain it long enough for the majority of pollutants to be removed.
- Wetland Planter Areas: filter out waste from runoff via various physical, chemical and biological processes, utilizing wetland plants.

Detention and Discharge from Lake:

70% of urban runoff pollutants are contained within the first 1/3 to 1/2-of-inch of initial stormwater runoff. In order to contain this first inch, Bridgeport Lake would need to provide a storage are of 2.9 acre-feet (AF); the lake actually provides retention for 0.25 feet over its entire surface area, or 3.75 AF, which is more than enough capacity to retain initial stormwater runoff.

Project Elements:

- 15-Acre Residential Lake
- Stormwater Runoff Treatment & Detention For 70-Acre Tributary Area
- Lake Water Quality Enhancers: Biofilters, Aeration & Wetland Planters



CLIENT:
Newhall Land



Santa Clara River Soil Cement Bank Protection - Valencia, California

PACE facilitated the ground breaking use of soil cement as a means of flood control along the Santa Clara River. To date, PACE has planned, designed and managed construction of 33,000 lf (250,000 CY) of soil cement bank protection and currently is in the design phase for another 36,000 lf (280,000 CY). The project success is due to a combination of innovative engineering, use of cost effective design and construction materials and methods, and multiple stakeholders' participation, including Los Angeles County Department of Public Works, environmental resource agencies and the general public.

Soil cement was implemented as an equal, if not superior alternative to traditional bank protection applications (i.e. concrete or rip-rap). In addition to the flood protection and erosion control benefits, soil cement has numerous other advantages including:

VALUE ENGINEERING

- Construction costs savings of 40 to 60% over conventional bank protection methods.
- 30-50% reduction in construction time as compared to conventional bank protection methods.

AESTHETICS (PUBLIC BENEFIT)

- Buried soil cement bank protection reduces environmental impact and allows for natural vegetation establishment.
- Exposed soil cement or future exposure of soil cement will provide a natural embankment stabilization appearance.

SAFETY

- The stepped soil cement face provides improved public access out of riverbank in event of an emergency.
- Reduced flow depths and velocities at riverbanks by creating a stabilized overbank area.

ENVIRONMENTAL RESOURCE PROTECTION

- Reduced habitat disturbance and excavation as a result of the setback and buried soil cement bank protection.
- Use of native material (approximately 90%) results in less trucking of material to the project site, and consequently less road traffic, pollution and mining of natural resources.

FLOOD CONVEYANCE DURABILITY AND MAINTENANCE

- Soil cement is a durable and non-erosive bank stabilization system.
- 8-foot wide placement of soil cement results in a stable structure

river engineering / bank protection

Project Elements:

- 70,000 Linear Feet (530,000 Cubic Yards) of Soil Cement River Bank Protection Complete Or In Planning
- Facilitated Ground Breaking Approval of Bank Protection Application by Los Angeles County Department of Public Works
- Use of $\pm 90\%$ Native Materials Protect Natural Integrity of River Banks, Minimizes Encroachment Into River and Protects Natural Wildlife Habitat
- Lead Engineer For All River and Tributary Watershed Study and Plans For Newhall Land



CLIENT/OWNER:
Newhall Land

Mountain House Creek Restoration - Tracy, California

PACE has been instrumental in implementing an innovative and natural approach to water resource management for the newly created town of Mountain House, a self-sustaining 4,800-acre master planned community that at build-out will be home to 43,500 residents. As lead water resource consultant, PACE has provided development-wide stormwater management planning and creek restoration design services for Mountain House Creek, a signature feature to the development.

PACE has been responsible for the creative watershed planning program that included the development of a Stormwater Master Plan Update, the restoration and enhancement of the 13,400 foot long (over 2.5 miles) Mountain House Creek and design/coordination related to the drainage and stormwater treatment as part of the golf course and 100-acre+ residential manmade lake.

The stormwater management features add significant value to the overall community by including pedestrian linkage and multi-functional open space areas. Additionally, the plan eliminates numerous large diameter storm drains and detention basins by routing on-site runoff through the Mountain House Creek, residential lake system and golf course. This re-routing will significantly reduce capital costs for stormwater management and ensure that Mountain House Creek will have year-round flows, thereby enhancing the environmental restoration and aesthetic quality of the development.

Project Elements:

- 4,800-Acre Development-wide Stormwater Management Planning
- 13,400 LF Creek Restoration & Enhancement Plan
- Golf Course / Residential Lake Stormwater Management Planning



CLIENT:
Trimark Communities
OWNER:
Mountain House Community Services District

Mountain House Water Reclamation Facility - Tracy, California

PACE was hired by strategic partner, PERC, the project Design-Builder, to facilitate the replacement of the development's existing 0.45 MGD aerated lagoon wastewater treatment plant to a 3.0 MGD PERC Activated Sludge Process (ASPTM) water reclamation facility. PACE provided design, permitting and start-up services. The facility is designed to meet strict Title 22 effluent requirements for unrestricted reuse. The new facility utilizes a two-tank SBR process for biological oxidation of organics and secondary clarification. Tertiary treatment will be accomplished through the SBR, Aquadisk cloth media filtration, and advanced UV disinfection. The Mountain House WRF is among the first facilities in the United States to utilize a UV Disinfection System certified under NWRI to meet California Title 22 requirements.

The facility also provides sludge processing reuse to meet EPA Class B biosolids. Through an innovative design approach, Mountain House CSD will realize tremendous energy savings through the use of micro-fine bubble diffuser panels in the SBRs and the use of low-energy Flygt "banana blade" mixers. This will represent the first application of these types of diffuser panels in a U.S. SBR facility. Treatment takes place in underground tanks, significantly reducing land requirements and improving the facility's aesthetics. Additionally, a unique structural concrete deck design will reduce construction time and cost. Future expansion plans will bring the facility's treatment capacity to 5.4 MGD. Upon completion, the existing lagoon plant will be decommissioned.

wastewater treatment

Project Elements:

- 3.0 MGD PERC Activated Sludge Process (ASP™) Water Reclamation Facility
- Meets Title 22 Effluent Requirements for Unrestricted Use
- Two-Tank Hybrid SBR Process for Biological Oxidation of Organics and Secondary Clarification
- UV Disinfection System Certified by California Department of Health Services Under NWRI
- EPA Class B Biosolids Sludge Processing



CLIENT:
PERC
OWNER:
Mountain House Community Services District

Mossdale Landing Stormwater Pump Stations - Lathrop, California

pumping facilities & storage

PACE provided the developers and the City of Lathrop with design services including civil, mechanical, electrical, structural and instrumentation engineering on four separate stormwater pump stations. As part of the master stormwater plan prepared for the City by MacKay & Soms, these stations convey stormwater from developed inland areas to the San Joaquin River.

PACE's innovative design allowed for the use of similar pumping equipment to that which the City already had, but centered on value-engineering the number of pumping units and controls to reduce the overall capital cost of the project. By using submersible solids-handling sewage pumps in combination with an automatically cleaned trash screen, the City is assured that the station will always pump whatever flows to it.

PACE's 40 CFS pump station cost \$600,000 less to construct than a 17 CFS pump station built for another development in the same city, in the same year, utilizing the same Flygt pump, and built by the same contractor. When asked what the principal cost savings were, the contractor said, "PACE's simplified structural design and motor controls, coupled with the use of additional smaller pumps," was the major difference.

Instead of using two large pumps running on VFD units, PACE opted to design six smaller pumps with soft-start motor controls. This also allowed the use of two common pump models for three of the four stations, reducing the City's need to stock multiple spare parts.

Project Elements:

- Six Separate Stormwater Pump Stations (Capacities of 30 to 56 CFS)
- Automated Mechanical Trash Screening
- Remote Radio SCADA and PLC Controls
- Architecture of Pump Buildings Matches Development Style
- Dry Weather Pump Station Integrated within Each Main Station Enabled More Stable Flows and Maintained Dry Main Section Over 90% of Operation Time



Pipe header & pump related valves



Standby generator provides emergency power



Stormwater inlet and screen

CLIENT:
Pulte Homes
OWNER:
City of Lathrop

Sheraton Wild Horse Pass Resort - Chandler, Arizona

In order to reconnect the tribal people with their native roots to the Gila River, the Gila tribal community hired PACE to turn their vision of recreating the river into a reality. PACE provided complete design services for a 1.5-mile replica of the historic river. Meandering along Sheraton Wild Horse Pass Resort's entry road, the river features rapids, rock outcroppings and manmade rock formations scattered along the river's edge. Wetland planters and sand bars recreate the natural flow of the desert river that ends in a 3.5-acre lake at the rear of the 550-room resort.

The river's circulation system provides variable river flow of up to 9,800 gpm to simulate dry and wet season conditions. An additional .5-mile river defines the front of the resort, and is not only aesthetically appealing, but also a functioning boat taxiway for guests going to and from the hotel, golf course and casino. For guests who prefer to walk, PACE designed a river-spanning 36-foot wide arch bridge.

PACE's design was not limited to the river. The resort pool complex includes a main pool, sports pool, two spas, a children's pool and a twisting water slide, all of which enhance guests' enjoyment of the property. Finally, PACE designed a signature rock formation and waterfall, which drops three floors into the hotel's main bar, for the hotel lobby. By bringing the river back to life through the Wild Horse Pass Resort river project, the Gila community can once again share the spirit of the Gila River.

streams

Project Elements:

- 1.5 Mile Replica of Historic Gila River
- 3.5 Acre Lake
- Resort Pool Complex Including Main Pool, Sports Pool, Two Spas, Children's Pool and Waterslide
- Signature Rock Formation and Waterfall in the Hotel's Main Bar in Lobby



CLIENT/OWNER:
Gila Band of Mission Indians

Canyon Club at Crystal Cove - Newport Beach, California

swimming pools & spas

PACE provided design services and services during construction for the Crystal Cove Recreation Center Pool and Spa area. The pool area includes a 3,375 sq. ft. main pool, 225 sq. ft. kids wading pool, 300 sq. ft. spa, a round fountain at the entry of the recreation center and the pool and spa features' mechanical equipment. Additionally, PACE performed an evaluation to compare the advantages/disadvantages of standard pool design with a chlorine disinfection system versus a saltwater pool design. While conventional chlorine disinfection was employed at this project, PACE has been retained to design a saltwater pool system for The Irvine Company's Pelican Hill development.

Project Elements:

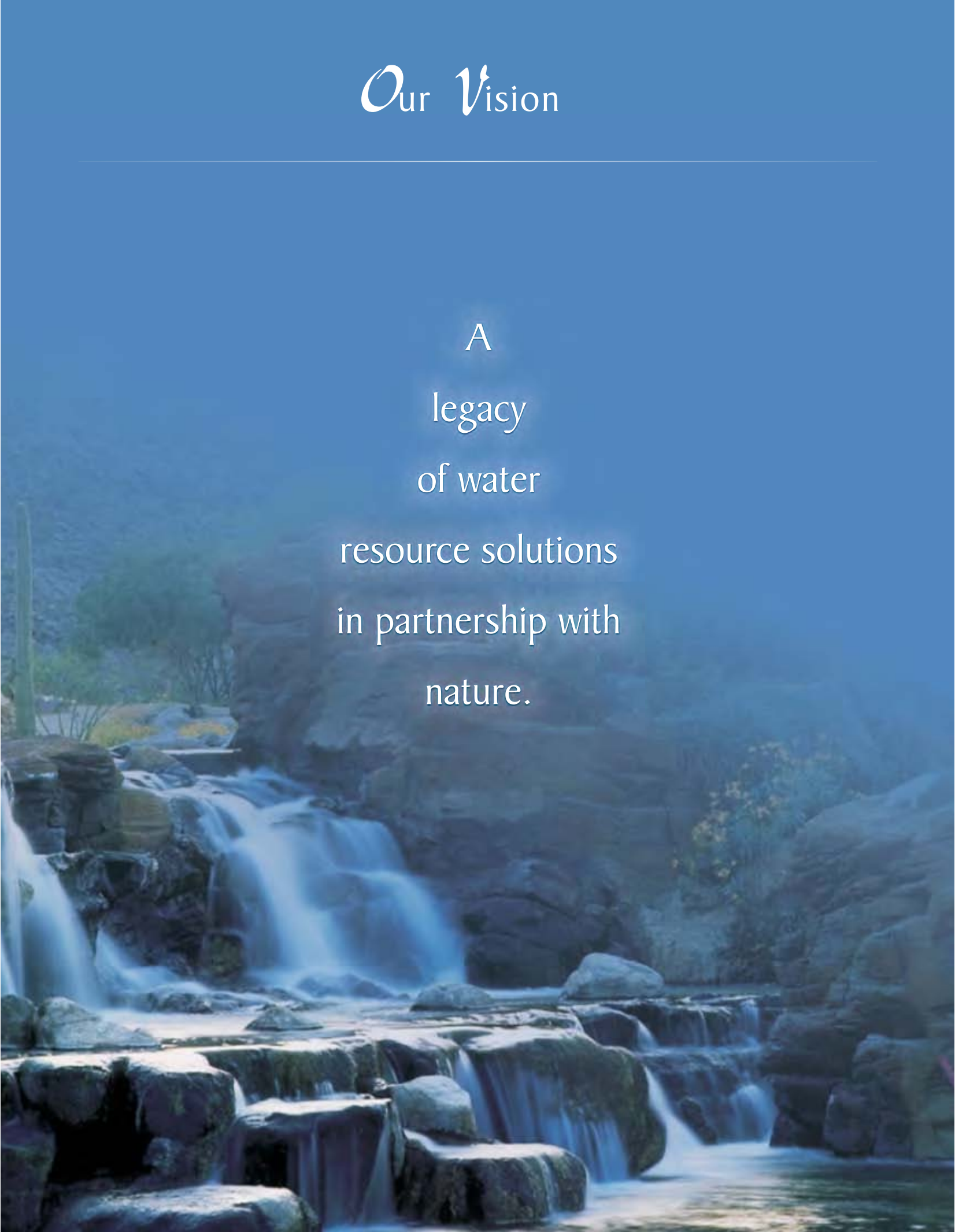
- 3,375 Sq. Ft. Main Pool
- Children's Wading Pool
- Spa
- Round Entry Feature as Fountain



CLIENT:
Burton Landscape Architecture Studio
OWNER:
Irvine Company

Our Vision

A
legacy
of water
resource solutions
in partnership with
nature.



WATER RESOURCE SOLUTIONS

**17520 Newhope Street, Suite 200 - Fountain Valley, CA 92708
714.481.7300**

*

**5250 Claremont Avenue, Suite 238 - Stockton, CA 95207
209.472.3737**

*

**One Gateway, 426 N. 44th Street, Suite 120 - Phoenix, AZ 85008
602.275.8066**

www.p-a-c-e.com

