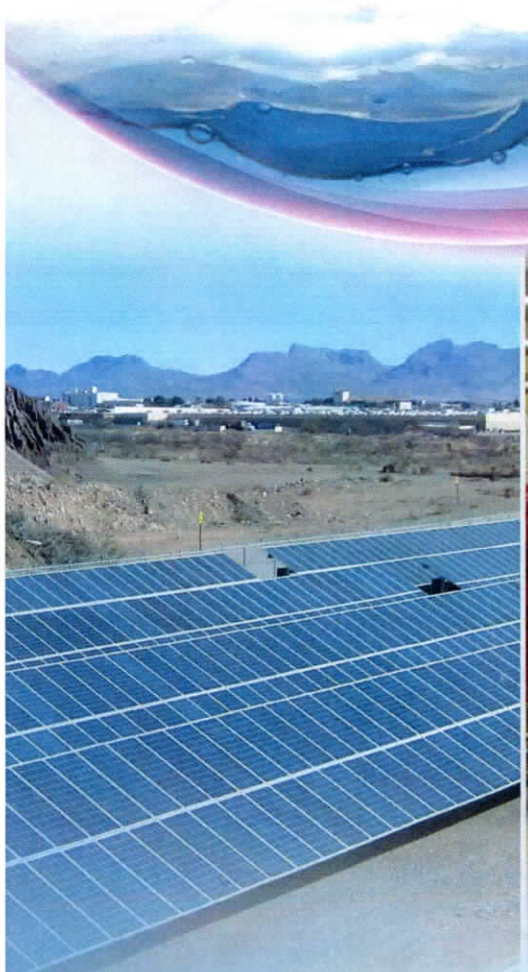
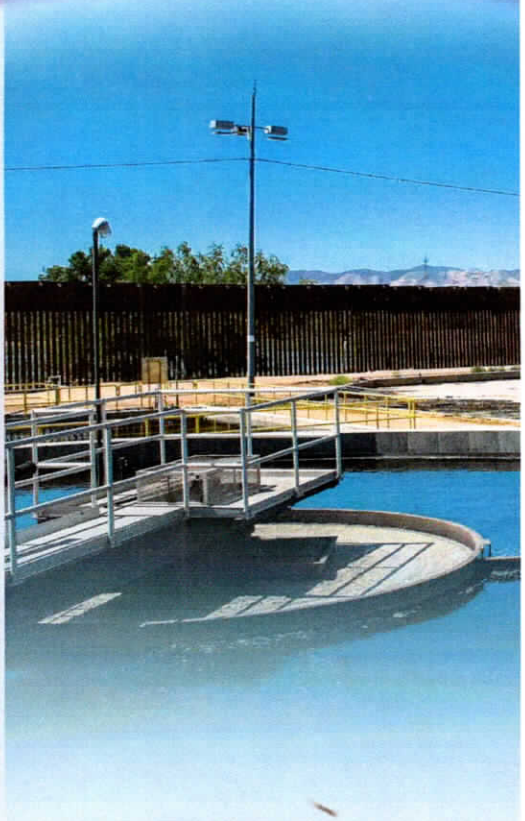
STATEMENT OF QUALIFICATIONS FOR THE CITY OF DOUGLAS

PRELIMINARY ENGINEERING REPORT (PER) FOR EFFLUENT REUSE (2025-PW-004)





PREPARED FOR:

CITY OF DOUGLAS

City of Douglas
425 10th Street
Douglas, Arizona 85607

PREPARED BY:

PACE
Advanced Water Engineering

8723 E. Via de Commercio, #A-204
Scottsdale, AZ 85258
480. 991.3595 | www.pacewater.com

#C374 | SEPTEMBER 26, 2024

contents

PACE
Advanced Water Engineering

September 26, 2024

Rene Rios *Procurement Specialist*
City of Douglas – 425 10th St., Douglas, Arizona 85607

Re: Statement of Qualifications for City of Douglas
Preliminary Engineering Report (PER) for Effluent Reuse (2025-PW-004)

Dear Mr. Rios,

The City of Douglas is taking important proactive steps to secure the sustainability of its water resources by exploring methods for effluent reuse and its associated funding. PACE is proposing a team and approach to this project based on extensive experience with USDA and other entities to gain funding and implement water and wastewater improvement projects. Our team will provide unique perspective and support to the City to accomplish the project goals, and offers the following key qualifications:

01 **DOUGLAS WWTP EXPERIENCE OFFERS SEAMLESS TRANSITION:** We have worked with the City of Douglas with the design and installation of the solar photovoltaic panel arrays at the WWTP to help reduce outside power purchase. Our knowledge of the facility will allow us to "hit the ground running" without a need to familiarize ourselves with the facility. With proven performance working with you, we believe the City will benefit from our commitment to your needs or concerns and to provide engineering services that brings value to your community.

02 **SIGNIFICANT LOCAL & BORDER COMMUNITY EXPERIENCE:** PACE has significant local experience working with wastewater infrastructure evaluations, design, and construction including in Bisbee, Sierra Vista, Patagonia, San Luis, and Somerton. This experience demonstrates our team understands the unique needs of these communities and approaches necessary for project success.

03 **EXTENSIVE FEDERAL/STATE FUNDING EXPERIENCE AND SUCCESSFUL PER TRACK RECORD:** Our experience and continuous interaction with federal and state funding agencies ensures our ability to meet requirements for compliance and funding administration activities. PACE has been involved with 27 federally and State-funded projects in the southwestern US (Arizona, California) in the last 17 years working with USDA-RD, WIFA, CDBG, NADB, and others. We have completed 17 Preliminary Engineering Reports (PERs) and have helped secure over $135 million in funding for these projects. PACE provided NADB funding support for the City of Douglas for the solar addition to the WWTP.

04 **ARIZONA SMALLER COMMUNITIES/DISTRICT EXPERIENCE ENSURES SENSIBLE APPROACH:** Our experience with and understanding of smaller community infrastructure financing limitations has led us to develop successful strategies for a valuable product that exceeds expectations. Our design philosophy centers on modest, simple, cost-effective designs with reduced up-front capital costs, increased ease of operation, and minimal operational and maintenance costs. Our team is programmed to consistently perform value engineering throughout the design phase to ensure we meet project needs without sacrificing quality while avoiding over-engineering.

As always, we appreciate the opportunity to continue our relationship with the City. All of our contact information is provided below. Please feel free to contact me if you have any further questions.

Sincerely,

Mike Krebs, MBA, PE
Contract Manager / Vice President, Environmental Water Division – Arizona Office Manager

mobile: (602) 741-2115 *office: (480) 991-3595* *e-mail: mikekrebs@pacewater.com*
8723 E. Via de Commercio #A-204 | Scottsdale, AZ 85258 | 480.991.3595 | pacewater.com

PACE

FIRM
BACKGROUND

ABOUT PACE

Pacific Advanced Civil Engineering, Inc. (PACE) is a ***specialized civil engineering firm offering advanced water resource services with a regional office in Scottsdale, AZ.*** We offer a wide range of engineering services related to water, wastewater, and stormwater management and water resource permitting and regulatory compliance to ensure projects are both economically viable and environmentally sustainable. Our engineering approach focuses on maximizing value by creating multi-use infrastructure systems, cost-effective phasing strategies, and systems that include environmental, aesthetic, and recreational uses. Guided by the principle of our approach, ***we deliver engineering solutions that are reliable, easy to construct, and straightforward to operate***.

Incorporated Year **1987 /**
Legal Form: **C-Coporation,**
State of California.
DUNS 14-356-4719

Employees (approx.) Firm **100**

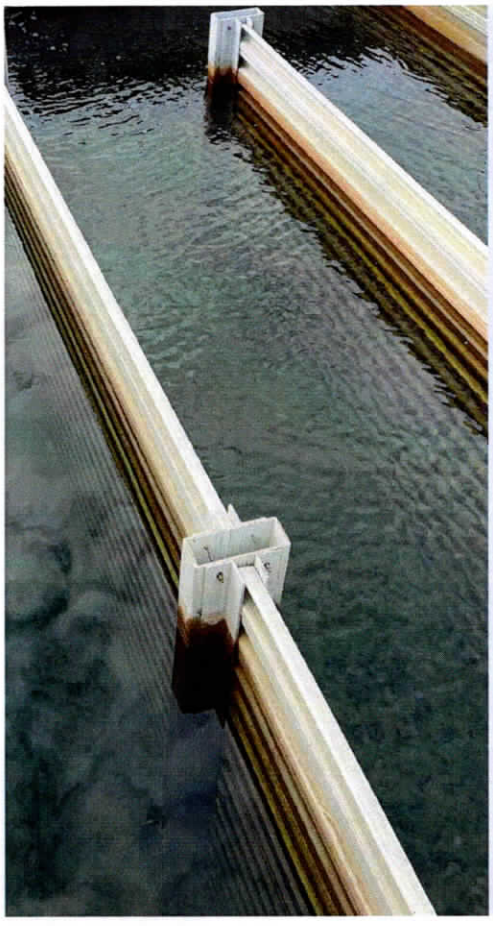
Contact Person **Mike Krebs, MBA, PE**, *Project Manager*
D (714) 824-6590 | C (602) 741-2115 | mikekrebs@pacewater.com

Headquarters: 17520 Newhope St., Suite 200,
Fountain Valley, CA 9270 | (714) 481-7300

Local Work Office: 8723 E. Via de Commercio, #A-204,
Scottsdale, AZ 85258 | (480) 991-3595

Engineering Services

- Water / Wastewater
- Water / Sewer Pipeline
- Stormwater
- Permitting



relevant expertise areas provided for the last 35+ YEARS

- Wastewater Process & Infrastructure Evaluations, Master Planning, & Design
- Wastewater Quality Assessment, Treatment Development, Planning, & Permitting
- Collection Infrastructure Component Design / System Improvements
- Pumping Facilities & Conveyance / Collection Pipes
- Effluent Reuse Design and Management
- Sludge Processing & Biosolids Management Planning & Design
- Energy Efficiency Evaluation & Alternative Energy System Design
- Value Engineering, Constructability Review & Accurate Cost Estimation
- Construction and O&M Cost Estimating
- Electrical, Controls & Instrumentation
- Construction Management / Field Assistance
- Funding Assistance & Administration

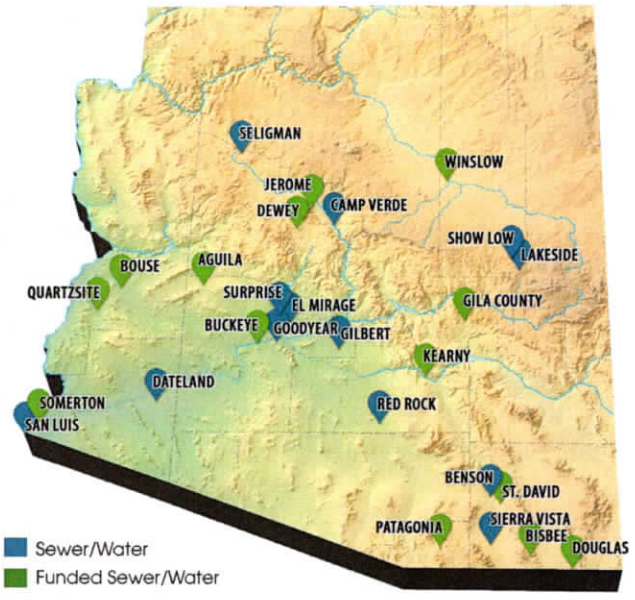
KEY QUALIFICATIONS

01 Douglas WWTP Experience Offers Seamless Transition

Our core team has worked with the City of Douglas to install new solar photovoltaic panel arrays at the WWTP to help reduce outside power purchase and with the new Port of Entry project. Our knowledge of the facility will allow us to "hit the ground running" without a need to familiarize ourselves with the facility.

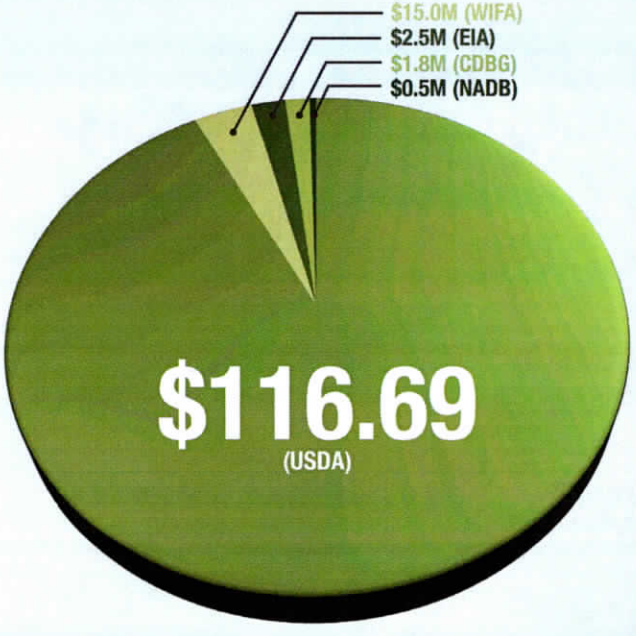
02 Significant Local & Border Community Experience

PACE has significant local experience working with wastewater infrastructure evaluations, design, and construction including in Bisbee, Sierra Vista, Patagonia, San Luis, and Somerton. This experience demonstrates our team understands the unique needs of these communities and approaches necessary for project success.



▲ Arizona smaller communities/district experience

03 Extensive Federal/State Funding Experience and Successful PER Track Record



Our experience and continuous interaction with federal and state funding agencies ensures our ability to meet requirements for compliance and funding administration activities. PACE has been involved with 27 federally and State funded projects in the southwestern US (Arizona, California) in the last 17 years working with the U.S. Department of Agriculture - Rural Development (USDA-RD), Water Infrastructure Finance Authority of Arizona (WIFA), Community Development Block Grant (CDBG) program, North American Development Bank (NADB), and others. We have completed 17 Preliminary Engineering Reports (PERs) and have helped secure over $135 million in funding for these projects.

USDA - $116.69M
Berry Utilities Clearwater Water System
Buckeye, AZ Berry Utilities Aguila Water System, Aguila, AZ
Bouse Domestic Water Improvement District, Bouse, AZ
Dateland WTP Upgrades & Solar Addition, Dateland, AZ
Jerome WWTP Improvements, Jerome, AZ
Kearny Water Treatment, Kearny, AZ
Kokopelli Springs Resort Water/Wastewater, St. David, AZ
Quartzsite WWTP Upgrade, Quartzsite, AZ
Quartzsite Wastewater System Phase 2, Quartzsite, AZ
San Jose WWTP Upgrades, Bisbee, AZ
Smith Way Well, Somerton, AZ
Somerton Biosolids Removal, Somerton, AZ
Somerton WWTP Phase III Expansion, Somerton, AZ
TRSD Wastewater Collection System Phase 1, Gila County, AZ
TRSD Wastewater Collection System Phase 2 & 3, Gila County, AZ
Tuolumne Utilities District WWTP Improvements, Sonora, CA
Valley Vista Lift Station and Force Main, Somerton, AZ
White Horse Ranch Water System Improvements, Dewey, AZ

WIFA - $15.0M
Chino Valley WRF Improvements, Chino Valley, AZ
Dateland WTP Upgrades & Solar Addition, Dateland, AZ
Douglas WWTP Solar Addition, Douglas, AZ
Quartzsite WWTP Upgrade, Quartzsite, AZ
San Jose WWTP Solar Addition, Bisbee, AZ
Somerton Park Irrigation Study, Somerton, AZ
Somerton WWTP Phase III Expansion, Somerton, AZ
TRSD Wastewater Collection System Phase 1, Gila County, AZ
TRSD Wastewater Collection System Phase 2 & 3, Gila County, AZ

EIA - $2.5M
Kearny Water Treatment, Kearny, AZ
Quartzsite Water System Improvements, Quartzsite, AZ
Somerton SCADA Upgrades, Somerton, AZ
TRSD Wastewater Collection System Phase 2 & 3, Gila County, AZ

CDBG - $1.8M
Orange Grove Potable Water System, Somerton, AZ

NADB - $0.5M
Patagonia WWTP Improvements, Patagonia, AZ

04 Arizona Smaller Communities/District Experience Ensures Sensible Approach

Our experience with and understanding of smaller community infrastructure financing limitations has led us to develop successful strategies for a valuable product that exceeds expectations. Our design philosophy centers on modest, simple, cost-effective designs with reduced up-front capital costs, increased ease of operation, and minimal operational and maintenance costs. Our team is programmed to consistently perform value engineering throughout the design phase to ensure we meet project needs without sacrificing quality while avoiding over-engineering.

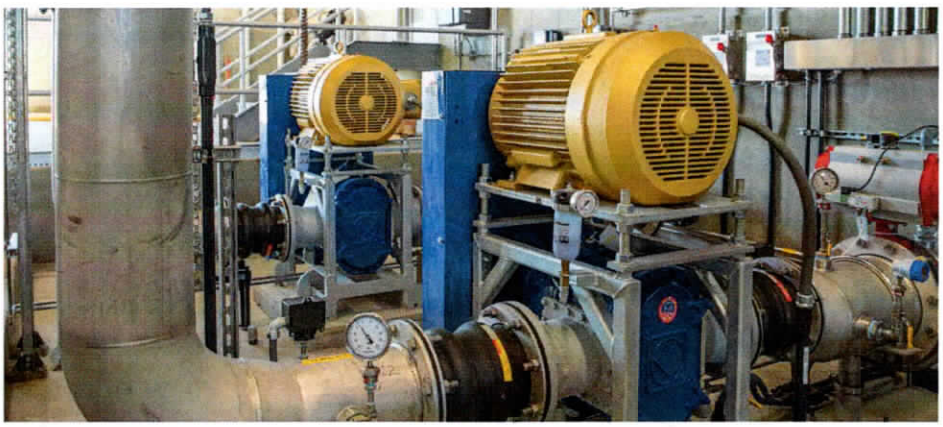
EXPERIENCE AND SERVICE CAPABILITIES

Wastewater Treatment

PACE has experience designing and permitting a wide range of process technologies based on project needs. From Conventional Activated Sludge and Oxidation Ditches to sophisticated sequencing batch reactors (SBRs) and membrane bioreactors (MBRs), PACE seamlessly provides our clients with high-performance, cost-effective solutions to their treatment needs. We have repeatedly provided treatment facility solutions that are innovative, cost-effective, straightforward to construct, and simple to operate. The water exiting PACE-designed wastewater reclamation facilities is clean and safe for water applications, including storage reservoirs, advanced irrigation treatment systems, cooling tower filtration systems, and pump stations for recycled water application, as well as recharge and injection systems to store recycled water underground.

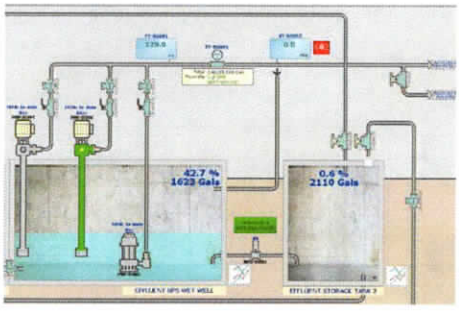
Beneficial Reuse Applications

It is important for water to be used and conserved properly and efficiently in order to sustain the livelihood of communities. One way to maximize available water is to recycle the water for beneficial reuse. PACE is committed to sustaining our greatest natural resource and creating new sources of high-quality water. Treated gray water or wastewater can be reused for irrigation, aquifer recharge, or landscape impoundments. Understanding recycled water storage and distribution is paramount to reduce operations and maintenance costs and prevent nuisance odors. PACE has effectively computer-modeled such systems and designed aeration, mixing, and oxygenation systems to prevent stagnation. PACE has also provided on-call operations services for numerous recycled water servicers for short-term emergency response chemical and equipment applications.



Pumping & Regulating Stations

PACE has completed numerous pump facility upgrades and rehabilitation projects. Our direct experience in design, construction, and operations provides us a unique ability to identify and work around these site issues while maintaining capital and operational budgets. PACE has worked with vertical turbine, centrifugal, and horizontal split-case mechanical equipment systems with constant pressure application using variable frequency drives (VFDs).



Instrumentation & Controls

PACE's in-house Instrumentation & Controls group has extensive experience in the design, configuration, programming, and commissioning of programmable logic controller (PLC) systems and Supervisory Control and Data Acquisition (SCADA) systems. In-depth knowledge of control and instrumentation systems equipment will seamlessly integrate mechanical design with equipment control functions, providing complete turnkey systems. Using our expertise in design, construction, and operation of water / wastewater distribution facilities to provide a system design that is robust and encompassing in data collection and control, yet provides the usable information operators need, without the clutter of "information overload".

Constructability, Operability Review, and Operations Expertise Inherent in Design

PACE was born from a water construction company and, as such, has extensive Design-Build (DB) / Design-Build-Operate (DBO), Construction-Manager-at-Risk (CMAR), and Value Engineering experience that drives us to consider constructability of all elements of our design. This experience provides the City with a sound technical design and also ensures that the facility will be easy to construct and operate, with reduced time of delivery and reduced capital and operational costs. Our team includes senior licensed engineering staff who also are or have been certified operators. This benefits the Project, as our design team will be able to integrate with City staff more effectively, delivering a system design that is focused on ease of operation and maintenance. Our operations experience will also be critical to construction, startup, and commissioning of the facilities, working hand-in-hand with the future operators throughout the process.

Services During Construction

PACE's extensive experience with both design-bid-build and design-build projects has provided specialized hands-on experience to proactively assist contractors to meet the design intent and solve challenges prior to improper procurement or installation. Our philosophy for construction management is to encourage contractors to verbally communicate potential solutions to RFIs and submittal revisions prior to formalizing them in writing so that coordinated and agreed upon directions have opportunities to be completed in the first response. Additionally, we are well-versed in various agency requirements for funding opportunities.

Planning and Feasibility

PACE has in-house expertise to prepare various studies, such as recycled water system expansion planning, water master planning, water system planning for regional improvements, water supply assessments, pipeline alignment and facility siting studies, urban water management plans, water demand and supply studies, and asset management.

PROJECT **TEAM**

TEAM ORGANIZATION CHART

PACE offers the City of Douglas strong experience on wastewater upgrade and effluent reuse throughout Arizona and proposes a dedicated team of specialized wastewater engineers and specialists who are fully committed to maintaining their assignment for the duration of the project. Resumes are included in Appendix A.

CITY OF DOUGLAS

PROJECT MANAGER / FUNDING ADMINISTRATION / CONSTRUCTION ESTIMATING
Michael G. Krebs, MBA, PE

PRINCIPAL / QA/QC
James Matthews, PE

WASTEWATER CONSULTING ENGINEER
Duong T. Do, PE, F.ASCE

SR. PROJECT ENGINEER
Taylor Pierce, PE

PROJECT COORDINATOR / FUNDING / PERMITTING
Andrea Jaycox

KEY TEAM MEMBER TABLE

NAME AND ROLE	YRS OF EXPERIENCE, EDUCATION, AND PROFESSIONAL REGISTRATION	SCOPE OF SERVICES/ EXPERTISE AREAS	RELATED PROJECT EXPERIENCE
Mike Krebs, MBA, PE *Project Manager / Funding Administration / Construction Estimating* 	44+ years MBA BS Civil Engineering, University of Kentucky AZ PE: 43417	• Wastewater treatment • Project/construction management • Estimating and value engineering • Design management • QA/QC • Constructability • Funding administration	• Douglas WWTP Solar Addition – Douglas, AZ • Somerton WWTP Upgrades and Effluent Management Plan – Somerton, AZ • San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ • Tri-City Regional Sanitary District Phase I, II & III Wastewater Collection System & Water Reclamation Facility – Gila County, AZ • Quartzsite WWTP Upgrades – Quartzsite, AZ • Tribute Water Reclamation Facility – Sierra Vista, AZ • Patagonia WWTP Improvements – Patagonia, AZ
James Matthews, PE *Principal / QA/QC* 	32+ years BS Civil Engineering, San Diego State University AZ PE: 34090 Former Wastewater Treatment Operator Certification: AZ	• Wastewater treatment • Instrumentation & controls systems • Water conveyance • Reclaimed water systems • Pump stations / mechanical • Pipeline systems / hydraulics • Water storage facilities • QA/QC	• Douglas WWTP Solar Addition – Douglas, AZ • Somerton WWTP Upgrades and Effluent Management Plan – Somerton, AZ • SPA 2 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • SPA 3 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • San Jose Wastewater Treatment Plant – Bisbee, AZ • Quartzsite Wastewater Treatment Plant Evaluation and Expansion – Quartzsite, AZ • Sarival Water Reclamation Facility – Goodyear, AZ • Tribute Water Reclamation Facility – Sierra Vista, AZ

NAME AND ROLE	YRS OF EXPERIENCE, EDUCATION, AND PROFESSIONAL REGISTRATION	SCOPE OF SERVICES/ EXPERTISE AREAS	RELATED PROJECT EXPERIENCE
Duong T. Do, PE, F.ASCE *Wastewater Consulting Engineer* 	28+ years BS Environmental Engineering, Cal Poly San Luis Obispo AZ PE: 40050 Former Wastewater Treatment Operator: CA	• Wastewater treatment • Effluent recharge • Pump stations • Water resource master planning and permitting • Facility renovations • Water conveyance • Water storage facilities • Recycled water systems	• Somerton WWTP Headworks Upgrade and Effluent Management Plan – Somerton, AZ • San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ • SPA 2 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • SPA 3 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • Tri-City Regional Sanitary District Phase I, II & III Wastewater Collection System & Water Reclamation Facility – Gila County, AZ • San Jose Wastewater Treatment Plant – Bisbee, AZ • Quartzsite WWTP Upgrades – Quartzsite, AZ • Sarival Water Reclamation Facility – Goodyear, AZ • Douglas WWTP Solar Addition – Douglas, AZ • Sierra Vista EOP Water Reclamation Facility – Sierra Vista, AZ • Patagonia WWTP Improvements – Patagonia, AZ
Tayor Pierce, PE *Sr. Project Engineer* 	14+ years BSE Civil Engineering, Arizona State University AZ PE: 70097 Water Treatment Operator Certification: CA	• Wastewater treatment • Water conveyance • Pump stations • Water storage facilities • Facility renovations • Licensed wastewater treatment operator	• Douglas WWTP Solar Addition – Douglas, AZ • San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ • Tri-City Regional Sanitary District Phase 1, 2 & 3 Wastewater Collection System & Water Reclamation Facility – Gila County, AZ • Sarival Water Reclamation Facility (WRF) – Goodyear, AZ • Sierra Vista EOP Process Improvements – Sierra Vista, AZ • Patagonia WWTP Improvements – Patagonia, AZ
Andrea Jaycox *Project Coordinator / Funding / Permitting* 	24+ Years Associates in General Studies, Paradise Valley Community College	• Project management support • Contract administration • Cost tracking • Permitting application and agency coordination • Funding application content development, agency compliance activity coordination	• Somerton WWTP Upgrades and Effluent Management Plan – Somerton, AZ • San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ • SPA 2 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • SPA 3 Water Reclamation Facility and Effluent Reuse – Surprise, AZ • Tri-City Regional Sanitary District Phase I, II & III Wastewater Collection System & Water Reclamation Facility – Gila County, AZ • San Jose Wastewater Treatment Plant – Bisbee, AZ • Quartzsite WWTP Upgrades – Quartzsite, AZ • Sarival Water Reclamation Facility – Goodyear, AZ • Douglas WWTP Solar Addition – Douglas, AZ • Sierra Vista EOP Water Reclamation Facility – Sierra Vista, AZ • Patagonia WWTP Improvements – Patagonia, AZ

EXPERIENCE **OF FIRM**

RELEVANT EXPERIENCE

The following is a summary of select wastewater experience in the areas pertinent to the Douglas WWTP Effluent Reuse project performed in the last 20 years to demonstrate our technical expertise.

Project Name	Capacity (MGD)	Delivery Method	Facility Process	Class A+ or Equivalent	Effluent Reuse	Funded (State/ Federal)	Facility Modification
Palm Valley WRF, *Goodyear, AZ*	4.2	DBO	SBR	x			
City of Sierra Vista EOP WWTP Upgrades, *Sierra Vista, AZ*	4.0	DBB	ASBP				x
Sarival WRF, *Goodyear, AZ*	4.0	DBO	MBR	x	x		
City of El Mirage WRF, *El Mirage, AZ*	3.6	DBO	SBR	x	x		x
Sundance WRF Phase II, *Buckeye, AZ*	3.5	DBO	SBR	x	x		x
City of San Luis West WWTP, *San Luis, AZ*	3.0	CMAR	MBR	x		x	x
City of Show Low WWTP, *Show Low, AZ*	2.5	CMAR	Biolac				x
City of Winslow WWTP, *Winslow, AZ*	2.2	DBB	ASBP	x	x	x	x
Pinetop-Lakeside Sanitary District WWTP Improvements, *Lakeside, AZ*	2.0	DBB	OD		x		x
City of Somerton Phase III Expansion, *Somerton, AZ*	1.8	CMAR	SBR	x	x	x	x
SPA 3 WRF, *Surprise, AZ*	1.8	DBO	SBR	x	x		
City of Bisbee San Jose WWTP, *Bisbee, AZ*	1.2	DB	SBR		x	x	x
SPA 2 WRF, *Surprise, AZ*	1.2	DBO	SBR	x	x		
Sundance WRF Phase I, *Buckeye, AZ*	1.2	DBO	SBR	x	x		
Tartesso WRF, *Buckeye, AZ*	1.2	DBO	SBR	x	x		
City of San Luis East WWTP, *San Luis, AZ*	1.0	DBB	SBR				x
Town of Quartzsite WWTP Expansion, *Quartzsite, AZ*	0.9	DBB	SBR			x	x
City of Sierra Vista Tribute WRF, *Sierra Vista, AZ*	0.5	DBB	MBR	x	x		x
Chino Valley WRF Capacity Expansion Technical Evaluation, *Chino Valley, AZ*	0.5	DBB	MBR	x	x	x	x
Tri-City Regional Sanitary District Wastewater Collection & Treament, *Gila County, AZ*	0.3	DBB	MBR	x	x	x	x
Red Rock WRF, *Pinal County, AZ*	0.3	DBO	SBR	x	x		
Whetstone Ranch WRF, *Whetstone, AZ*	0.25	DBB	DBO	x	x		
Town of Jerome WWTP Improvements, *Jerome, AZ*	0.1	DBB	SBR			x	x
Town of Patagonia WWTP Improvements, *Patagonia, AZ*	0.1	DBB	EAAS			x	x
San Carlos Apache Gold Casino WRF and Water Infrastructure, *Globe, AZ*	0.1	DB	SBR		x		
City of Burbank WRP Upgrades, *Burbank, CA*	12.0	DBB	ASBP	x			x
City of Manteca WQCF Improvements Project, *Manteca, CA*	9.23	DBB	MBR	x	x		x
City of San Clemente WRP Upgrades, *San Clemente, CA*	7.2	DBB	BNR	x			x
Mountain House WRF Phase III Expansion, *Mountain House, CA*	5.4	DBB	MBR	x	x		x
City of Santa Paula WRF, *Santa Paula, CA*	4.2	DBOF	MBR	x	x	x	
Mountain House WRF Phase II Expansion, *Mountain House, CA*	3.4	DBO	SBR	x	x	x	x
City of Adelanto WWTP Upgrades, *Adelanto, CA*	3.0	DBO	ASBP		x	x	x
City of Patterson WWTP, *Patterson, CA*	3.0	DBB	MBR	x			x
Tuolumne Utilities District Sonora Regional WWTP Upgrades, *Sonora, CA*	2.6	DBB	EAAS	x	x	x	x
City of Lathrop WRF Expansion, *Lathrop, CA*	2.5	DBB	MBR	x	x		x
City of Santa Monica SWIP Advanced Water Treatment Facility, *Santa Monica, CA*	1.5	DBO	MBR	x	x		
City of Solvang WWTP Enhanced Treatment Study, *Solvang, CA*	1.5	DBB	MBR	x	x		x
Barona WRF (Original and Upgrades), *Lakeside, CA*	0.8	DBO	SBR	x	x		x
Civita WRF, *San Diego, CA*	0.3	DBO	MBR	x	x		
Menlo Country Club Water Recycling Treatment System, *Woodside, CA*	0.25	DB	MBR	x	x		
Chumash WRF Expansion, *Santa Ynez, CA*	0.2	DBO	MBR	x	x		x
UC Santa Cruz Hagar WRF, *Santa Cruz, CA*	0.15	DBO	MBR	x	x		

ASBP Activated Sludge Biological Process
BNR Biological Nutrient Removal
DBB Design Bid Build
DBO Design Build Operate
EAAS Extended Aeration Activated Sludge
MBR Membrane Bioreactor
OD Oxidation Ditch
SBR Sequential Batch Reactor

FUNDING / PER / FACILITY UPGRADE / EFFLUENT REUSE EXPERIENCE

Somerton WWTP Phase III Expansion, Wastewater Master Plan, and Park Irrigation (Effluent Management) Master Plan *Somerton, AZ*

Relevant Features

- 1 PER completed
- Wastewater treatment infrastructure
- Effluent management evaluation
- Smaller city / rural community
- Federally and state funded project

Somerton WWTP Phase III Expansion
PACE worked with the City's CMAR contractor Kiewit to provide an in-depth process and economic analysis of the existing 0.8 MGD facility and proposed expansion to 1.2 MGD. The results of this study determined that conversion of the existing four-tank sequencing batch reactor (SBR) system to a four-stage BardenPho process would provide the City an additional 1.0 MGD of capacity for the same capital cost of building two additional SBR reactors, which would provide only 0.4 MGD of additional capacity. This is equivalent to creating 1.0 MGD at under $7/gallon compared to only 0.4 MGD at over $15/gallon. PACE prepared a USDA-RD PER to assist in obtaining $7 million in funding. The completed secondary facility began operation in May 2011 with consistent effluent results below 2 mg/L biological oxygen demand (BOD), 2 mg/L total suspended solids (TSS), and 5 mg/L total nitrogen without filters. Overall, the BardenPho system consumes approximately 20% less energy, reduces energy demand charges by 70%, and produces equal or better effluent quality.

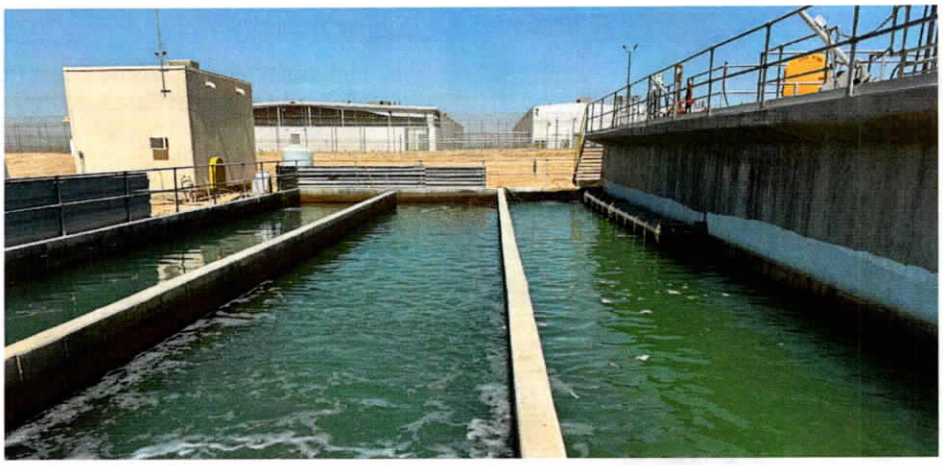
Reference Contact
Sam Palacios *CIP Project Manager (former Somerton Public Works Director)*
City of Yuma
155 West 14th Street, Yuma, AZ 85364
(928) 373-4524
sampalacios@yumaaz.gov

Valley Vista New Sewer Lift Station and Force Main PACE was engaged by the City to provide engineering services for the decommissioning of a small wastewater treatment plant and lift station, and subsequently for design of a new lift station and sewer collection system piping to redirect flows to the upgraded Somerton WWTP. The 0.04 MGD packaged plant has served the residents of the Valley Vista Apartment Complex for over 15 years, and the aging plant is struggling to perform, causing maintenance costs to increase. PACE worked closely with the City of Somerton and Yuma County on the development the USDA-RD PER Amendment that analyzed alternatives for the Valley Vista residents and proposed a new larger lift station for conveyance of flows to the City's WWTP. The new lift station was constructed adjacent to the existing lift station to minimize infrastructure costs. The system required 8,700 linear feet of pipe to traverse from the Valley Vista WWTP Lift Station to the Somerton WWTP.

Park Irrigation (Effluent Management) Master Plan To explore the possibility of utilizing non-potable water for irrigation of the local City parks and stormwater detention basins, the City of Somerton commissioned PACE to perform a Park Irrigation Study. In total, approximately 80 acres of parks were considered. The parks/basins were either being irrigated with City potable water/filter backwash from the water treatment plant or not irrigated at all. The study included an evaluation of non-potable water sources available for irrigation use, including the effluent produced in the City of Somerton's 1.8 MGD WWTP, non-potable wells, and surface water resources. Since this evaluation considered the use of effluent, the project was eligible for a green infrastructure improvement grant from WIFA. PACE assisted the City with the grant application process, and WIFA was able to provide the City with a $21K grant to use toward the development of this study.

Wastewater Master Plan As a result of growth, PACE developed an updated Wastewater Master Plan for the City of Somerton. The updated Wastewater Master Plan assessed the City's existing and projected wastewater generation against the existing sewer infrastructure, such as collection systems, sewer lift stations, and wastewater treatment systems, to determine whether the existing capacity and treatment process would meet the City's current and future wastewater treatment needs. Cost estimates and 20-year Capital Improvement Program (CIP) recommendations, listed in order of priority, were developed to support anticipated population growth.

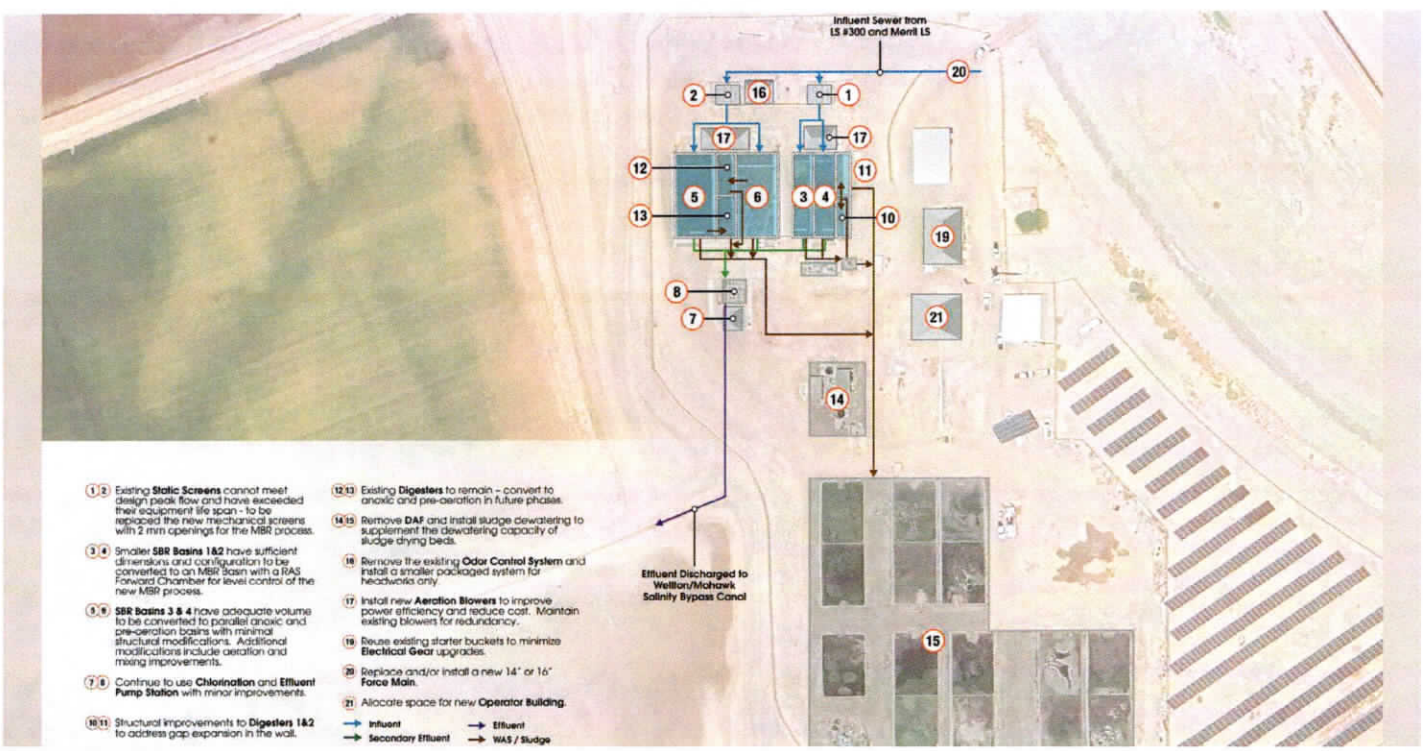
City of San Luis East and West WWTPs Evaluations and Improvements *San Luis, AZ*



Relevant Features

- Local experience
- Wastewater infrastructure evaluation and master planning
- Smaller city / rural community
- Effluent treatment and discharge improvements

PACE evaluated the City of San Luis East Wastewater Treatment Plant (WWTP) and West WWTP to identify limiting factors that could impede the facilities from meeting current and projected demand. The assessments identified treatment capacity deficiencies, identified conceptual process expansions, and estimated the time and cost needed for improvement projects. Based on the results of the evaluations, PACE designed improvements to the East WWTP to address deficiencies associated with the headworks and chlorine contact basins, including an effluent piping modification to improve chlorine and effluent contact mixing and reduce effluent retention time. The West WWTP is being converted to a new membrane bioreactor (MBR) activated sludge process to achieve a 3.0 MGD treatment capacity.



Reference Contact
Jorge Perez *Assistant Director of Public Works*
City of San Luis
1090 E Union Street, San Luis, AZ 85349
(928) 341-8577
jperez@sanluisaz.gov

SPA 2 Water Reclamation Facility and Effluent Reuse *Surprise, AZ*

Relevant Features

- **High quality effluent meeting Arizona Title 18 Class A+ Reclaimed Water Standards**
- **Vadose zone wells and percolation as an alternative effluent recharge process**
- **Effluent management plan that identified infrastructure requirements and determined the most cost-effective effluent disposal options**
- **Microfiltration and chlorination to maximize the life of the vadose zone wells**

PACE was the Engineer of Record for two design-build projects in Surprise Planning Area 2 (SPA 2), the WRF and the Effluent Storage, Reuse, and Recharge System. The 1.2 MGD WRF will produce high quality effluent meeting Arizona Title 18 Class A+ Reclaimed Water Standards, and the effluent disposal system incorporates storage, reuse, and recharge. Effluent is to be reused within the new Asante development. As part of the design, PACE developed an effluent management plan with a water balance analysis that helped size the 1.3-million-gallon effluent storage basin, the 5,600 gpm peak capacity effluent pump station, and the vadose zone recharge wells. The effluent distribution system is phased to allow for expansion as the development grows and to reduce upfront capital and O&M costs. Due to site constraints for future WRF expansion and no authorization to discharge to neighboring waterways, PACE recommended the use of vadose zone wells as an alternative to dispose of effluent and recharge the underlying groundwater aquifer. In addition to the vadose zone wells, a small percolation basin recharges effluent from the ground surface and provides a backup for the wells. Before entering the vadose zone wells, the effluent will be further filtered through a 5-micron filtration system and chlorinated. This lowers the solids loading to the wells and inhibits any microbial formation on the well screening, maximizing the life of the wells.

Reference Contact
Nate Owen *President*
PERC Water
17520 Newhope St. #180, Fountain Valley, CA 92708
(714) 352-7752
nowen@percwater.com

SPA 3 Water Reclamation Facility and Effluent Reuse

Surprise, AZ

Relevant Features

- 1.8 MGD, SBR treatment process meeting ADEQ Title 18 Class A+ Reclaimed Water standards
- Percolation basins for effluent recharge
- Design, startup support, and commissioning services
- Value engineering performed at each design phase
- Design completed in 4 months and construction completed in 17 months

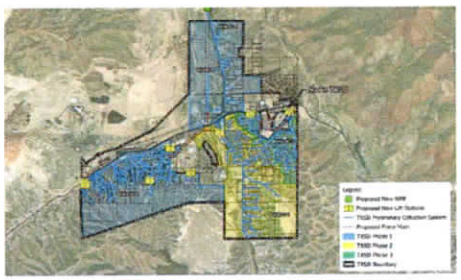
PERC Water and PACE provided design-build services for a new WRF servicing the Austin Ranch and surrounding communities in the Surprise Planning Area 3 (SPA 3) region. The WRF was designed with state-of-the-art technology from the top equipment manufacturers and features Huber Fine Screens, Kaeser Blowers, Ozonia UV Disinfection, Flygt Pumps and Mixers, and Aqua-Aerobic Cloth Filters. The SPA 3 WRF utilizes the PERC ASP design and has a design capacity of 1.8 MGD. Effluent is recharged through percolation basins that meet Arizona Title 18 Class A+ Reclaimed Water Quality Standards.

Reference Contact
Nate Owen *President*
PERC Water
17520 Newhope St. #180, Fountain Valley, CA 92708
(714) 352-7752
nowen@percwater.com

TRSD Phases 1, 2, & 3 Wastewater Treatment & Collection System *Gila County, AZ*

Relevant Features

- **2 PERs completed**
- **Class A+ effluent production**
- **Wastewater treatment infrastructure**
- **Smaller city / rural community**
- **Federally and state funded project**



Phase 1 PACE provided planning, funding assistance, Section 208 WQMP permitting, and assessment process support of a district-wide system to provide sewer collection, wastewater treatment, and effluent disposal. Tri-City Regional Sanitary District (TRSD) encompasses unincorporated communities surrounding Globe and Miami, AZ, a majority of which rely on septic systems and cesspools with substandard conditions or that are completely out of service. TRSD is taking action to provide upgraded infrastructure that will bring value to its community. PACE assisted TRSD in obtaining funding through the USDA-RD by development of a PER, which included master planning for project phasing.

Phase 1 consists of the installation of approximately 61,000 linear feet (LF) of gravity mains, 7,600 LF of force main, 270 new manholes, 650 new residential lateral service connections, a new main lift station, and a new 0.25 MGD membrane bioreactor (MBR) water reclamation facility producing Class A+ effluent. Effluent is reclaimed for non-potable reuse, including irrigation and on-site process water, with excess being infiltrated to help replenish the underlying aquifer.

Phases 2 & 3 PACE provided preliminary engineering services for Phases 2 & 3 and has submitted a PER and Environmental Assessment to USDA-RD in pursuit of funding. The PER was approved in September 2022 and TRSD is awaiting a letter of conditions (LOC). The collection system infrastructure consists of the installation of the following:

PHASE 2	PHASE 3
• 51,000+/- LF of gravity main • 2,600+/- LF of force main • 643+/- new residential lateral service connections • WRF Expansion	• 47,000+/- linear feet (LF) of gravity mains • 5,500+/- LF of force main • 537+/- new residential lateral service connections • WRF Expansion

Reference Contact
Robert Jacques *Board President*
Tri-City Regional Sanitary District
(512) 468-6957
PO Box 2198, Claypool, AZ 85532-2198
robertbjacques@gmail.com

City of Bisbee San Jose Wastewater Treatment Plant and Solar Array *Bisbee, AZ*

Relevant Features

- **1 PER completed**
- **Wastewater treatment infrastructure**
- **Smaller city / rural community**
- **Federally and state funded project**
- **High quality effluent for reuse applications**

With funding and grants from the United States Department of Agriculture (USDA), Water Infrastructure Finance Authority of Arizona (WIFA), and the North American Development Bank, the City of Bisbee developed a new wastewater treatment facility to replace three outdated existing facilities and meet the City's capacity needs. PACE was hired by the WWTP contractor, Jonovich Companies, to provide value engineering and ultimately redesigned the wastewater treatment facility at a capital cost savings of $2.4 million. The WWTP is comprised of a two-basin SBR system with ancillary headworks, solids dewatering, and UV disinfection systems. Operations and maintenance are simplified with a state-of-the-art SCADA and PLC control system that allows the WWTP to be monitored 24 hours a day, 7 days a week. The new 1.2 MGD facility is permitted as ADEQ Class B+ treatment, but since facility operations began in February 2006, water quality has consistently been at levels meeting Class A+ standards.

After the completion of a solar power feasibility study, PACE assisted the City in designing a green solution to offset Arizona Public Service (APS) power costs with the installation of a 400kW DC photovoltaic system that will reduce annual operation and maintenance costs at the plant by approximately 30%. PACE assisted the City in the APS Performance Based Incentives and performed APS coordination throughout the project. PACE also assisted with the application process to receive a WIFA loan for this renewable energy upgrade, and the City was able to obtain the loan funding for the entire project cost with $400,000 forgiveness. The system has been in operation since December 2014 and has significantly lowered power costs.

Reference Contact
Teryl Murray *(formerly with City of Bisbee, Wastewater Superintendent)*
Granite Construction
PO Box 2198, Claypool, AZ 85532
(520) 307-1425
teryl.murray@gcinc.com

Quartzsite Wastewater Treatment Plant Expansion, Tyson Wash Manhole Protection Improvements, and Sewer Collection System *Quartzsite, AZ*

Relevant Features

- **2 PERs completed**
- **Wastewater treatment and infrastructure improvements**
- **Smaller city / rural community**
- **Federally and state funded project**

▲ *A short video of the award-winning project – Town of Quartzsite Wastewater Treatment Plant Upgrades*
https://www.youtube.com/watch?v=P9W6M1BaXSI

Wastewater Treatment Plant Expansion

To increase capacity, the Town of Quartzsite moved forward with an expansion design only to stop short of construction due to funding requirements. PACE was asked to perform an assessment value engineering review of the proposed expansion, which would increase current capacity from 0.45 MGD to 0.90 MGD by constructing a second sequencing batch reactor (SBR) basin. PACE prepared an in-depth evaluation that included detailed hydraulic analysis, biological process modeling, energy consumption analysis, and electrical and control system review. The evaluation revealed the proposed expansion did not provide adequate summer low flow treatment and would double the electrical power requirements. PACE also identified several cost reduction measures that provided better day-to-day treatment performance, an energy cost reduction of 40% equating to a savings of $25,000/yr at current flows and up to $40,000/yr at design flow. One of the solutions included dividing the existing SBR basin into two smaller basins, allowing better low flow treatment with the capacity to treat the design flow of 0.9 MGD. The approach of splitting the SBR basin instead of duplicating saved nearly $750K used for further improvements, including a new headworks system and controls/SCADA system. This project was completed in January 2020.

Tyson Wash Manhole Protection Improvements

Alongside the 2020 upgrade to the wastewater treatment plant, the Town completed improvements consisting of infiltration / inflow mitigation by reinforcing 16 manholes that lie within Tyson Wash along the main line that conveys wastewater to the WWTP. Improvements were made to strengthen integrity, prevent floodwater infiltration causing problems for treatment capabilities, and alternatively minimize risk of backflow of untreated wastewater into Tyson Wash.

The Quartzsite WWTP and Tyson Manhole Improvements project was awarded the 2020 APWA Project of the Year – Award for Small Cities/ Rural Communities and the 2020 AZ Water Association Treatment Plant of the Year – Award for Small Systems.

Quartzsite Sewer Collection System Phase 2

PACE developed a USDA-RD PER for the Quartzsite Wastewater System Phase 2. With the PER approved, PACE is proceeding with design of approximately 25,000 LF of new gravity collection system piping with 186 connections to end use of on-site septic systems.

Reference Contact
Emmett Brinkerhoff *Public Works Director*
Town of Quartzsite
580 East Quail Trail, Quartzsite, AZ 85346
(928) 927-4561
ebrinkerhoff@quartzsiteaz.org

Sarival Water Reclamation Facility *Goodyear, AZ*

Relevant Features

- **Produces ADEQ Title 18 Class A+ effluent for regional reuse at an off-site recharge facility**
- **Effluent percolation basins**
- **4.0 MGD MBR treatment process using 1/3 less energy than traditional MBR systems**
- **Enclosed treatment and odor control**
- **Accelerated delivery of 24 months (design through construction)**

The new Sarival WRF treats an average day flow capacity of 4.0 MGD with a maximum day flow capacity of 6.0 MGD and a peak hour capacity of 10.0 MGD, providing support to an existing built out regional WRF for current loading and future flow conditions. The facility uses an MBR treatment process followed by chlorination disinfection to meet Arizona Department of Environmental Quality (ADEQ) Title 18 Class A+ requirements for unrestricted reuse of recycled water. The treatment process consists of an advanced and integrated influent headworks and grit removal and washing system, followed by the advanced Closed Loop Reactor (CLR) secondary treatment process trains, coupled to four membrane separation trains and followed by the sodium hypochlorite disinfection process, chlorine contact basins, and effluent reclamation pump station. Effluent from the WRF is designed to go to two discharge points: one discharge point to the Liberty Aquifer Replenishment Facility, which is shared with another regional facility, and another discharge point to a local irrigation district's canal for irrigation use. At full buildout, the design of the WRF will provide an average daily flow capacity of up to 8.0 MGD with a maximum daily capacity of 12.0 MGD. Future phases of the facility will also introduce an advanced biosolids processing facility to handle solids processing for multiple treatment plants within the regional area. Under a design-build-operate project delivery led by PERC Water, design began in January 2022, with construction paralleling the final design beginning in June 2022, which led to the substantial fast-track completion being reached in January 2024.

Reference Contact
Rick Rhoads *Wastewater Process Optimization Manager*
Liberty Utilities
14222 W. McDowell Rd. Goodyear, AZ 85395
(623) 935-9367
Rick.Rhoads@LibertyUtilities.com

DOUGLAS EXPERIENCE

Douglas Wastewater Treatment Plant Solar Array Addition *Douglas, AZ*

Relevant Features

- **Douglas xxperience**
- **Wastewater treatment plant evaluation and upgrades**
- **Plant upgraded while remaining operational**
- **Smaller city / rural community**
- **Federally and state funded project**

PACE performed funding application/compliance assistance, a feasibility study, design and construction services for the City of Douglas WWTP Solar Photovoltaic (PV) Array project. After the completion of a solar power feasibility study, PACE assisted the City in selecting a green solution to offset Arizona Public Service (APS) power costs with the installation of a 301.3 kW DC photovoltaic system that will reduce annual operation and maintenance costs at the plant by approximately 30%. PACE assisted the City with the APS Performance Based Incentives and will be performing APS coordination through the project and application process to receive a WIFA loan for this renewable energy upgrade. The City was able to obtain the loan funding for the entire project cost with $300,000 forgiveness. PACE provided feasibility and alternatives analysis, design, permitting, and engineering construction services for the installation of this system. The project has been in operation since April 2016 and has significantly reduced the City's power costs.

Reference Contact
Rene Rios *Purchasing Specialist*
City of Douglas
425 10th St., Douglas, Arizona 85607
(520) 417-7317
rene.rios@douglasaz.gov

LOCAL EXPERIENCE

Patagonia Wastewater Treatment Plant Improvements *Patagonia, AZ*

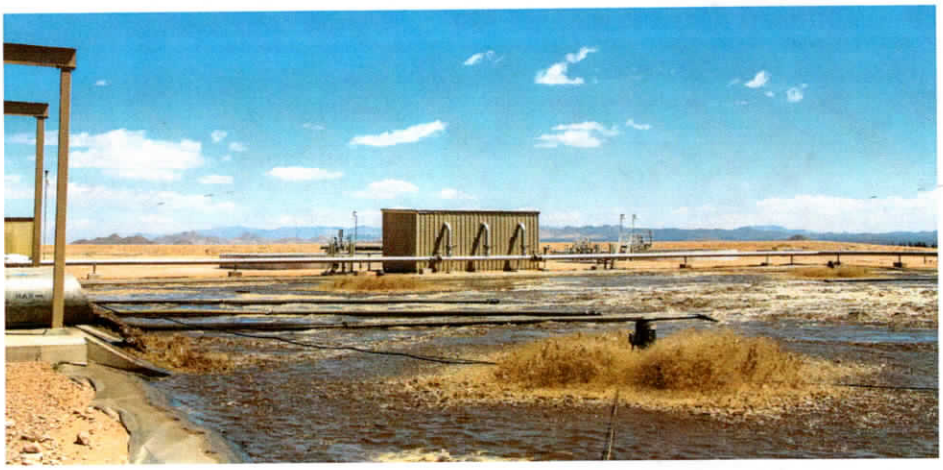
Relevant Features

- **Local experience**
- **Wastewater treatment plant evaluation and upgrades**
- **Plant upgraded while remaining operational**
- **Smaller city / rural community**
- **Federally and state funded project**

The Town of Patagonia owns and operates a 110,000 gallons per day (GPD) wastewater treatment plant (WWTP) that serves approximately 913 people in the community. Key components of the plant needed rehabilitation in order to improve process efficiencies, leading to operational cost savings. The facility was originally constructed of precast concrete wall panels and was leaking water through the joints between precast panels. These leaks posed a significant risk to the Town for potentially discharging untreated water to Sonoita Creek. In addition, the facility was constructed of a single process train without redundancy or the ability to isolate individual basins. As a result, the Town hired PACE to provide upgrades to the primary aeration blower, anoxic chamber agitator motor, headworks auger, belt press, blower/belt press separation, and chemical building with a focus on improving energy efficiency for the secondary process treatment train. PACE was also able to upgrade to a fine bubble aeration system with dissolved oxygen control which reduced the energy cost by 50%. These proactive steps promote both environmental and economic sustainability while producing high-quality effluent in a cost-effective manner. The Town was able to use NADB grant funding to finance the project and the O&M savings will financially benefit the full-time residents and promote future development in the Town. The project has recently been recognized with the APWA 2023 Project of the Year: Small Cities/Rural Communities-Environment Award and the Metropolitan Pima Alliance Common Ground Award.

Reference Contact
Ron Robinson *Town Manager*
Town of Patagonia
310 McKeown Ave, Patagonia AZ 85624
(520) 394-2229
patagoniagov@qwestoffice.net

Environmental Operations Park (EOP) WWTP Evaluation and Upgrade *Sierra Vista, AZ*



Relevant Features

- **Local Experience**
- **Wastewater treatment evaluation and upgrades**
- **Wetlands effluent polishing for groundwater recharge**
- **Smaller city / rural community**

PACE provided engineering design improvements to the City of Sierra Vista Environmental Operations Park (EOP) WWTP, a 4 MGD multi-cell advanced secondary lagoon treatment system. The existing EOP WWTP utilizes an aerated lagoon treatment system for secondary treatment, a constructed wetland for effluent polishing, and infiltration basins for final discharge through groundwater recharge. Although operating at approximately 3.0 MGD, the facility was not performing as originally designed. PACE provided the City with a complete design to upgrade the EOP WWTP and to meet all of its primary objectives. After a value engineering review of the EOP WWTP, the design upgraded the lagoon process to a Modified Ludzack-Ettinger (MLE) activated sludge process to provide nutrient removal and improve effluent quality. The upgrades consisted of converting two of the existing complete-mix basins into anoxic and aerobic reactors and installing two new secondary clarifiers. The remaining complete mix basins were converted into flow equalization basins, ensuring a constant flow rate through the process, which minimized the size requirements of the clarifiers. Additionally, inefficient surface aerators were replaced with more efficient fine bubble diffusers and turbine blowers. The design services included construction and operational cost estimation and 20-year life cycle cost estimation. The final construction cost estimation was within $100,000 or 2% of the contractor's submitted low bid. The upgrades also included the design of a 5-acre USEPA Class A Biosolids Composting Facility utilizing windrow composting. The upgraded facility has been in operation since January 2013 and has consistently met BADCT effluent requirements. The composting facility is active at full scale and producing Class A (Exceptional Quality) Biosolids for public sales distribution. The power requirement of the upgraded process is approximately 50% lower than the aerated lagoon process and providing a savings of more than $250,000/yr.

Reference Contact
Alan Humphrey *Sr. Civil Engineer (formerly with the City of Douglas)*
City of Sierra Vista
401 Giulio Cesare Avenue, Sierra Vista, AZ 85635
(520) 458-5775
a.humphrey1@cox.net

PROJECT
UNDERSTANDING AND APPROACH

PROJECT UNDERSTANDING

The City of Douglas is seeking professional engineering services for the development of a Preliminary Engineering Report (PER) to explore potential effluent treatment and reuse alternatives for the existing wastewater treatment facility, including upgrading to Class A or better effluent and implementing an effluent reuse system. The main purpose of developing these alternatives is to provide needed stability to the existing groundwater basins as part of the City's newly adopted conservation measures. This is proposed to be accomplished through effluent reuse, alleviating the aquifer depletion rate. The proposed modifications to the existing wastewater treatment plant (WWTP) will allow it to function as a water reclamation facility (WRF) that will provide reclamation of the facility's current rated capacity of 2.6 MGD and ensure exceptional effluent water quality for the foreseeable future. In addition, the improvements will accommodate near-term development within the City's service area while also providing flexibility in the City's long-term water planning efforts. Currently, the Class B+ effluent is being discharged into international waters to Mexico, where it is utilized for local irrigation.

PROJECT OBJECTIVES

Our team considers the following to be major Project objectives:

Groundwater Stability

Development of the most effective utilization of the existing WWTP effluent so that the effluent reuse or recharge can provide the greatest beneficial impact through increased groundwater stability.

Cost Alternatives

Development of a PER that will provide an alternatives cost analysis and associated cost matrix to be utilized for the funding of a selected alternative.

Funding/Budget

Assist the City in identifying potential funding sources and providing information for funding applications.

CRITICAL ITEMS

In order to properly execute a Scope of Work and to fully meet the Project objectives, we have identified the following Critical Items that need to be considered and addressed:

1. An understanding of the existing past, present, and future groundwater level trends within the aquifer, and the greatest impacts to the trending positive and negative.
2. Identify potential effluent reuse options within the City.
3. Work closely with a hydrogeologist during the evaluation process to determine the most effective beneficial reuse option(s) for the effluent.
4. The City will investigate any and all current agreements that may require discharge of the effluent to international waters (Mexico) and the impact, if any, of not discharging.
5. Develop potential approaches to improve the existing Class B+ effluent to Class A or better, which enables unrestricted reuse depending on the reuse approach.
6. Work with City staff to identify potential funding sources to ensure that the PER addresses those agencies' requirements; most funding agencies will require an Environmental Assessment.

PROJECT APPROACH

PACE and our staff proposed for this Project are familiar with the City of Douglas and this treatment facility. In addition, we have developed PERs and effluent master plans for other communities, and our unique experience at numerous rural and small community facilities throughout the southwestern U.S. positions us to offer great value to the City of Douglas.

ADDRESSING CRITICAL ITEMS

CRITICAL ITEM 01
Conceptual Design Report Preparation for Pursuing Funding and CMAR Selection

Data gathered through the City and the hydrogeologist will provide valuable information on the existing state of the aquifer and how it has been impacted by past events. This understanding coupled with future projections will provide a window into how to most effectively utilize the effluent to provide future groundwater stability and sustainability. This information will be incorporated into the Project alternatives analysis and selection.

CRITICAL ITEM 02
Identify Reuse Options Within the City

Data gathering will utilize GIS-developed aerial mapping of the City to pinpoint potential effluent reuse sites and lay out piping. Sites will be categorized by area, irrigation water usage, and potential piping needed to service the area. This information will be utilized in the PER for alternatives evaluation and selection.

CRITICAL ITEM 03
Hydrogeologist Evaluation

The information from critical item 01 will be utilized by a hydrogeologist to evaluate the effluent reuse options and determine the effluent reuse approach with the most positive impact on the groundwater aquifer. This information will be utilized in the PER for alternatives evaluation and selection.

CRITICAL ITEM 04
Existing International Water Discharge Agreements

The City will ensure that the current discharge into international waters can be diverted to reuse or recharge.

CRITICAL ITEM 05
Identify Several Approaches to Convert Existing WWTP to a WRF

PACE will utilize the existing WWTP as-builts and provide several initial graphic concepts to modify the facility into a WRF that will produce Class A or better effluent. The conceptual presentation will include cost estimates. This information would be discussed with the City and utilized in the PER for the alternatives analysis and selection.

Constructability and Operability Background Ensures Buildable and Low-Cost Reliable Operation

PACE has an extensive background in design-bid-build, design-build, and operations that provides a unique insight into Project designs to improve constructability and minimize construction costs.

Involve City O&M Staff Early and Often in Developing Final Design Option, Plans, and Specifications

PACE will use our experience in design, construction, and operations to assist the City in determining an optimal design and equipment selection for the Project. This starts by meeting with the City's Engineering team and Operations and Maintenance (O&M) staff to fully understand and solidify the Project objectives. PACE will review all data and perform a site visit with the O&M staff to understand the site layout and approach.

CRITICAL ITEM 06

Identify Potential Funding Sources

There are countless funding programs available for wastewater infrastructure throughout the U.S. offered at the federal, state, and local levels. The funding application processes and requirements can differ, making timing very important to ensure the Project's next steps proceed smoothly. In addition, a Project Environmental Assessment may be necessary for funding requirements. If needed, a subconsultant must be brought onto the team to complete the assessment. This need should be identified early to secure funding.

Work with the City's Grant Writer by Applying Our Team's Funding Expertise and Agency Contacts

We have been involved with 27 federally/state-funded projects in the southwestern U.S. (Arizona, California) in the last 17 years working with the U.S. Department of Agriculture – Rural Development (USDA-RD), Water Infrastructure Finance Authority of Arizona (WIFA), Community Development Block Grant (CDBG) program, North American Development Bank (NADB), U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), and others, and we have helped secure over $135 million in funding for these projects through various types of funding applications. Upon receiving the Notice to Proceed, we would reach out to our contacts to begin researching available funding options. We would supply any technical information as necessary. As directed by the City, PACE will provide support to the City grant writer to assist in identifying the potential sources and completing the application.

PROJECT MANAGEMENT

Our benchmark Project Management approach considers each individual project to remain flexible for the specific project needs and objectives concerning planning, scheduling, estimating, communication, quality assurance / quality control (QA/QC), etc. The Project Manager, Mike Krebs, will be responsible for all project management activities and will be the direct contact with the City of Douglas. He will coordinate all planning and design work with all subconsultants and staff. Regular meetings or teleconferences will be held with applicable Project team members and consultants to resolve any engineering study and/or design issues. Meeting minutes will be kept and retained in Project files.

Client Coordination

All correspondence to the client, whether incoming or outgoing, will be through the Project Manager. The Project Manager will keep the client informed of the Project's progress on a monthly basis unless otherwise indicated in the work plan or contract work scope. The monthly progress reports will, at a minimum include:

- Progress To Date
- List of Issues That May Affect Project
- Schedule / Objectives
- Schedule Status
- Work Planned for Upcoming Month

Scheduling

PACE will create a detailed schedule using Smartsheet that will be maintained on a monthly basis. This program is easy to read, follow, and maintain. Our Project schedule includes submittal dates, meetings, design progress, and more. If delays occur, in or out of our control, that impact the schedule, we will know early and allocate resources in order to keep the project on track. The established schedule includes initiating the Project immediately upon receipt of the Notice to Proceed.

All PACE project management efforts will be coordinated out of our office in Scottsdale, AZ. Regular coordination meetings will occur in the City of Douglas, or using one of the many meeting and coordination resources we have available such as Teams or Zoom (video conferencing), which allow us to minimize travel time for meetings. However, in-person meetings will be encouraged at critical Project durations (kick-off, final design submittals, etc.).

APPENDIX

A – RESUMES

project manager/ funding/administration/ construction estimating

Mike G. Krebs, MBA, PE

EDUCATION
Master of Business Administration Bellarmine College, Louisville, KY
BS Civil Engineering University of Kentucky, Lexington, KY

YEARS OF EXPERIENCE
44+ Years
Joined PACE in 2006

LICENSE/REGISTRATIONS
Professional Engineer / AZ – 2005 / 43417
Professional Engineer / AZ – C48382
Professional Engineer / ID – 12890
Professional Engineer / IN – 9300243
Professional Engineer / KY – 16446
Professional Engineer / VA – 20802

AFFILIATIONS
American Society of Civil Engineers
American Public Works Assoc.
Rural Water Association of AZ
Ducks Unlimited
Kentucky Colonel

Michael Krebs has Civil Engineering Project Management experience spanning back to 1980. His areas of expertise include water and wastewater treatment, project/construction management, bidding, estimating, and value engineering. His current responsibilities include managing design, QAQC, constructability, value engineering reviews, cost estimating, and construction oversight of all projects. Furthermore, Mr. Krebs also has 10 years' experience as Chief Engineer and Estimator then later President of a Heavy and Highway construction company where he worked on numerous CMAR projects including two wastewater treatment plants and several highway projects. He also has experience managing design-build projects for both water and wastewater systems.

RELATED EXPERIENCE

Somerton Effluent Management Master Plan – Somerton, AZ
In the interest of exploring the possibility of utilizing non-potable water for irrigation of the local City parks and stormwater detention basins, the City of Somerton commissioned PACE to perform a Park Irrigation Study. Mr. Krebs Served as Project Manager for the study which totals approximately 80 acres of parks. The parks/basins were previously either being irrigated with City potable water/filter backwash from the water treatment plant or not irrigated at all. The study includes an evaluation of non-potable water sources available for irrigation use including the effluent produced in the City of Somerton's 1.8 MGD Wastewater Treatment Plant, non-potable wells, and surface water resources. Since this evaluation is considering the use of effluent, WIFA deems this a green infrastructure improvement and was able to provide Somerton a $21K grant to use toward the development of this study with which PACE assisted the City in the grant application process.

San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ
Mr. Krebs served as Project Manager to perform an evaluation of the City of San Luis East Wastewater Treatment Plant (WWTP) and West WWTP to identify limiting factors that could impede the facilities from meeting current and projected demand. The assessment identified treatment capacity deficiencies, developed a conceptual process expansion, and estimated the time and cost needed for improvement projects. Based on the results of the evaluation, PACE designed improvements to the East WWTP to address deficiencies associated with the headworks and chlorine contact basins, including an effluent piping modification to improve chlorine and effluent contact mixing and reduce effluent retention time. The West WWTP is being converted to a new membrane bioreactor (MBR) activated sludge process to achieve a 3.0 MGD treatment capacity.

Somerton WWTP Phase III Expansion – Somerton, AZ
Mr. Krebs served as Project Manager for the City of Somerton's wastewater treatment facility expansion from 0.8 MGD to 1.6 MGD. The existing plant is a 0.8 MGD biological aeration process plant using SBR technology. PACE value engineered the original plan which called for 0.4 MGD expansion at a $6.2 million budget. PACE modified the original plan to utilize the 4-stage Continuous Flow Biological Nutrient Removal (BNR) Process and will be designed to have a flow capacity of 1.8 MGD when completed for the same budget, producing the following benefits: an additional 1.0 MGD of capacity instead of 0.4 MGD, creating 1.0 MGD at under $7/gallon versus the original 0.4 MGD at over $15/gallon, and reduced land use by conversion of the facility's process and using the existing tankage instead of duplicating and constructing four new SBR tanks. Mr. Krebs provided an engineer's opinion of cost in a preliminary engineering report. He then worked with the CMAR throughout the design on the GMP estimating and value engineering.

Tri-City Regional Sanitary District Phase 1, 2 & 3 Wastewater Collection System & Water Reclamation Facility – Gila County, AZ
Mr. Krebs is serving as the Project Manager for Phases 1, 2 & 3 of a new regional wastewater system for the Tri-City Regional Sanitary District (TRSD). TRSD encompasses over five square miles of residential, commercial, and

PROJECT MANAGER / FUNDING ADMINISTRATION / CONSTRUCTION ESTIMATING – Mike G. Krebs, MBA, PE

RELATED EXPERIENCE CONT.

industrial property in Gila County, AZ. The majority of the homes currently use cesspools and septic systems for wastewater disposal. Over 80% of these systems are functioning below ideal performance and some are completely out-of-service. The proposed project will abandon existing cesspools and septic systems and install of 8-10" sewer pipeline, lift stations, and a new MBR water reclamation facility that will serve approximately 4,200 residents.

Quartzsite WWTP Upgrades – Quartzsite, AZ

Mr. Krebs served as the Project Manager for the expansion of this existing 0.45 MGD SBR WWTP. The design upgrades included increasing the capacity to 0.9 MGD, improving water quality, process redundancy, and reducing operating costs. The challenge of the project was to provide a design that could be implemented within a 7-month window while maintaining treatment without the use of the existing single-basin SBR. Mr. Do developed a transition plan that converted the existing digester into a temporary SBR, while the existing single-basin SBR was upgraded to a two-basin SBR and equipped with new fine bubble aeration that is coupled with (3) 100 HP high-speed, hybrid screw blowers. The project also included upgrades to the influent lift station, headworks screening, chlorine gas disinfection system, and the onsite reuse pump system. The Quartzsite WWTP was awarded the 2020 APWA Project of the Year Award -Small Cities/ Rural Communities and the 2020 AZ Water Association Treatment Plant of the Year – Small Systems.

Douglas WWTP Solar Addition – Douglas, AZ

Mr. Krebs served as the Project Manager for the design of the Douglas WWTP Photovoltaic (PV) Solar Power Generation System project. After the completion of a solar power feasibility study, PACE assisted Douglas in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 301.3 kW DC photovoltaic system that will reduce annual operation and maintenance costs at the plant by approximately 30%. PACE assisted the City in the APS Performance Based Incentives and performed APS coordination through the project to receive the WIFA loan for this renewable energy upgrade. Douglas was able to obtain the WIFA loan for the entire project cost with $300,000 forgiveness. The project has been in operation since April 2016 and has significantly reduced the City's power costs.

Tribute Water Reclamation Facility – Sierra Vista, AZ

Mr. Krebs served as the Project Manager for the Sierra Vista WWTP. The WRF was designed to treat an initial average wastewater flow of 0.5 million gallons per day (MGD) and is expandable to an ultimate capacity of 2.0 MGD. The WRF will divert "scalp" wastewater from a nearby sewer interceptor and treat the wastewater to Class A+ reclaimed water standards, in order to supply reclaimed water for the irrigation of the Pueblo Del Sol (PDS) Golf Course and Tribute Development. Excess reclaimed water beyond the irrigation demand will be recharged by direct-aquifer injection wells.

Patagonia WWTP Improvements – Patagonia, AZ

Mr. Krebs served as Project Manager for the 110,000 gallons per day (GPD) wastewater treatment plant (WWTP) that serves approximately 913 people in the community. Key components of the plant needed rehabilitation in order to improve process efficiencies, leading to operational cost savings. The facility was originally constructed of precast concrete wall panels and was leaking water through the joints between precast panels. These leaks posed a significant risk to the Town for potentially discharging untreated water to Sonoita Creek. In addition, the facility was constructed of a single process train without redundancy or the ability to isolate individual basins. As a result, the Town hired PACE to provide upgrades to the primary aeration blower, anoxic chamber agitator motor, headworks auger, belt press, blower/belt press separation, and chemical building with a focus on improving energy efficiency for the secondary process treatment train. PACE was also able to upgrade to a fine bubble aeration system with dissolved oxygen control which reduced the energy cost by 50%. These proactive steps promote both environmental and economic sustainability while producing high-quality effluent in a cost-effective manner. The Town was able to use grant funding to finance the project and the O&M savings will financially benefit the full-time residents and promote future development in the Town. The project has recently been recognized with the APWA 2023 Project of the Year: Small Cities/Rural Communities-Environment and the Metropolitan Pima Alliance Common Ground Award.

PROJECT MANAGER / FUNDING ADMINISTRATION / CONSTRUCTION ESTIMATING – Mike G. Krebs, MBA, PE

RELATED EXPERIENCE CONT.

Dateland Water Treatment Plant Potable Water Treatment Upgrades – Dateland, AZ

Mr. Krebs served as the Project Manager for this water treatment project. PACE provided Dateland Public Service Co. with a selection of inland-desalination alternatives, engineering design, environmental permitting, grant funding application services, and construction management to improve and expand their existing groundwater Reverse Osmosis (RO) treatment system. The groundwater in the Dateland basin contains several trace contaminants including arsenic and fluoride, has irrigation inhibitors boron, chloride, and sodium, and overall contains high levels of TDS. The contaminants must be removed to comply with primary and secondary drinking water standards. This project scope included alternative analysis, funding through USDA-RD, & WIFA, performance specifications, final design, permitting, bid services, and construction services. In addition to the mechanical process work, PACE is also providing a preliminary alternative energy evaluation for the use of PV solar systems to power the expanded plant, turning "blue" into "green".

Pinetop Lakeside Sanitary District WWTP – Lakeside, AZ

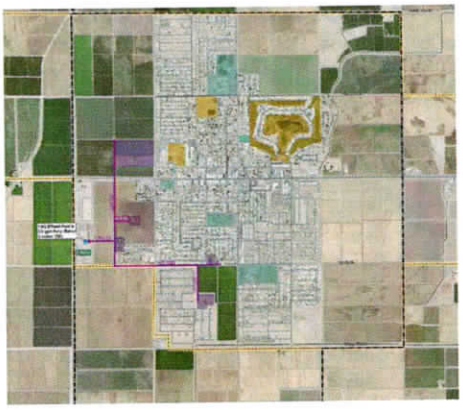
Mr. Krebs served as the Project Manager to provide full design services for the upgrades that will provide the following benefits 1) increased energy efficiency and process performance through replacement of aging equipment, 2) flow control to provide flow equalization to improve downstream process performance, 3) allow facility to meet original 2.0 MGD design treatment capacity and higher effluent quality, 4) heighten environmental stewardship through higher water quality discharge.

Valley Vista Sewer Lift Station & Force Main – Yuma County, AZ

Serving as Project Manager, Mr. Krebs led the team in this USDA-RD-funded wastewater collection system project. PACE was engaged by the City of Somerton to provide design services for the decommissioning of a small wastewater treatment plant and lift station, and subsequently for a new lift station and installation of a new sewer collection system that will redirect the flows to the newly upgraded Somerton WWTP. The new lift station will be constructed adjacent to the existing lift station to minimize infrastructure costs, such as connective piping and electrical services. The system requires 8,700 linear feet of pipe to traverse from the Valley Vista WWTP Lift Station to the Somerton WWTP. This proposed project was selected as the best alternative for the project based on positive revenue stream, reduced O&M cost; low life cycle cost, and minimized environmental impact to the surrounding environment.

Show Low Wastewater Treatment Plant Upgrades – Show Low, AZ

Mr. Krebs served as the Project Manager to convert a multi-cell aerated lagoon into a 2.5 MGD Extended Aeration Activated Sludge (EAAS) WWTP, using Parkson's Biolac Treatment Process. The City of Show Low had a 2-stage Aerated Lagoon that provided limited treatment. The effluent ammonia was in exceedance of 30 mg/L. The City commissioned PACE to evaluate, design, and assist in implementing the most appropriate and cost-effective solutions to upgrade and expand the City's existing WWTP. PACE led the design of the new Biolac process, which also included a new screening and grit removal headworks system, new influent pump station, new RAS/WAS pump station, two new 60' diameter secondary clarifiers, new chlorine gas disinfection system, 3 new high-speed air bearing turbo blowers, and new sludge dewatering screw press. Once constructed, the new facility was able to produce high effluent water quality with Total Nitrogen consistently averaging less than 3 mg/L. The Show Low WWTP was awarded the 2018 WateReuse Award.



Somerton Sewer Master Plan – Somerton, AZ

The City of Somerton has seen population growth since 2005. As a result of the growth, Mr. Krebs served as the Project Manager to provide an update to the existing City of Somerton Water Master Plan. The updated Wastewater Master Plan assessed the City's existing and projected wastewater generation against the existing sewer infrastructure, such as collection systems, lift stations, and treatment systems, to determine whether the existing capacity and treatment process will meet the City's current and future needs. The gravity sewer system encompasses 9 different service areas with over 180,000 lf of gravity lines that drain to 12 lift stations that convey sewer through 36,000 lf of force mains that make up the pressure sewer system. The master plan identified the current and projected wastewater generation rates, which were used to evaluate the existing gravity and pressure systems. Deficiencies were identified and improvements were evaluated and prioritized to develop a capital improvement roadmap for the City for the next 10 years. As part of the master plan, city-wide hydraulic models were developed using GIS data and mapping. Each lift station was closely evaluated to determine actual performance through site inspection and by performing field pump tests.

principal/ qa/qc

James A. Matthews, PE

EDUCATION
BS Civil Engineering San Diego State University - 1994

YEARS OF EXPERIENCE
32 years
Joined PACE in 1994
With others more than 2 years

LICENSE/REGISTRATIONS
Professional Engineer / AZ – 1999 / 34090
Professional Engineer / CA – 1997 / C57446
Professional Engineer / CO – 2018 / 0054243
Professional Engineer / FL – 2009 / 69722
Professional Engineer / HI – 2009 / 13718
Professional Engineer / ID – 2004 / 11229
Professional Engineer / NM – 2004 / 16491
Professional Engineer / TX – 2018 / 132370
Professional Engineer / UT – 2020 / 11893246-2202
Professional Engineer / VA – 2005 / 040716
NCEES 18-931-54
Wastewater Treatment Operator Certification:
1997 / WW023812

AFFILIATIONS
American Water Works Association (AWWA)
Water Environment Federation (WEF)

PUBLICATIONS
EPA's Small Flows Quarterly: "Hybrid Sequencing Batch Reactors"
Santa Margarita Water District: "Advanced Processes for Water Reuse"
City of Lathrop: Title 22 Recycled Water Training Program
PEARL Education Program: Electrical Power and Control Systems

James Matthews is highly regarded in the water, wastewater, recycled water, and stormwater industries for his tremendous wealth of practical knowledge and ability to use old and new technologies, hands-on experience, and research to produce value for his clients and their projects. Mr. Matthews has created designs for a multitude of award-winning projects, saving capital and operation costs, reducing construction schedules, and minimizing operation and maintenance needs on reservoirs, pump stations, and water & wastewater treatment facilities, by implementing creative ideas and concepts.

As both a licensed engineer and wastewater treatment operator, Mr. Matthews is a technical expert in infrastructure engineering design, construction, and operations. He has particular experience reviewing, troubleshooting, and renovating on over 250 projects in the US, Canada, and Central America.

However, his expertise is not limited to just water resources; having a wealth of knowledge in electrical, controls, and instrumentation. He has personally fabricated, programmed, and installed a multitude of custom control systems, which included PLC/PAC programming, radio telemetry, and Supervisory Control and Data Acquisition (SCADA) systems for numerous water, wastewater, and co-generation projects.

RELATED EXPERIENCE

Somerton Wastewater Treatment Plant Expansion – Somerton, AZ

Mr. Matthews served as the Principal Engineer and Senior Process Designer in the City of Somerton (located 9 miles south of Yuma, AZ) for the expansion of an existing 0.8 MGD SBR treatment facility. Under Mr. Matthews's direction, the project was re-evaluated from a simple copy of the existing 4-tank SBR, providing a total of 1.6 MGD, to converting the SBR tanks into a 4-stage Barden Pho process, providing 1.8 MGD capacity. The alternative provides the City with 10 to 15% more capacity at a cost savings of nearly 30% over the original SBR expansion. The facility design includes conversion and upgrades to the existing SBR aeration and mixing systems, the new 60-foot high-performance clarifiers, a new RAS/WAS pumping station, a new constant SRT control system and a new two-story solids dewatering building.

SPA 2 Water Reclamation Facility and Effluent Reuse – Surprise, AZ

Mr. Matthews served as Principal / QA/QC for the SPA 2 WRF and SPA 2 Effluent Storage, Reuse and Recharge System design/build projects where PACE was the Engineer-of-Record. The projects include the design of a 1.2 MGD WRF that will produce high quality effluent meeting Arizona Title 18 Class A+ Reclaimed Water Standards and the effluent disposal system that incorporates storage, reuse and recharge. Effluent is to be reused within the new Asante Development. As part of the design, PACE developed an effluent management plan with a water balance analysis that helped sized the 1.3-million-gallon effluent storage basin, the 5,600 gpm peak capacity effluent pump station, and the vadose zone recharge wells. The effluent distribution system is phased to allow for expansion as the development grows and to reduce upfront capital and O&M costs. Due to site constraints for future WRF expansion and no authorization to discharge to neighboring waterways, PACE recommended the use of vadose zone wells as an alternative to dispose of effluent and recharge the underlying groundwater aquifer. In addition to the vadose zone wells, a small percolation basin is also designed to recharge effluent from the ground surface and provide a backup to the vadose zone wells.

SPA 3 Water Reclamation Facility and Effluent Reuse – Surprise, AZ

Mr. Matthews served as Principal / QA/QC to provide design build services for a new water reclamation facility servicing the Austin Ranch and surrounding Communities in the SPA 3 region located in Surprise, AZ. The WRF was designed with state-of-the-art technology from the top equipment manufacturers and features

PRINCIPAL / QA/QC – James Matthews, PE

RELATED EXPERIENCE CONT.

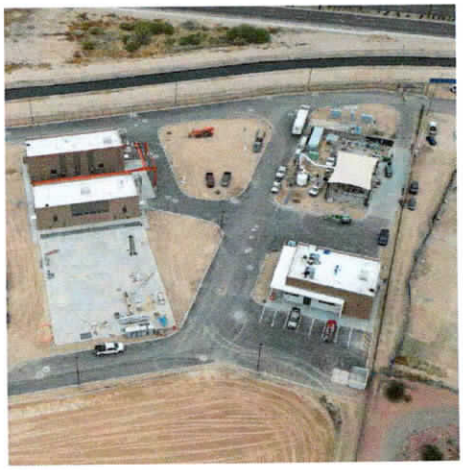
Huber Fine Screens, Kaeser Blowers, Ozonia UV Disinfection, Flygt Pumps and Mixers and Aqua-Aerobic Cloth Filters. Effluent is recharged through percolation basins that meet AZ Title 18 Class A+ Reclaimed Water Quality Standards. The SPA 3 WRF has been successfully operating since 2010. In addition to the WRF, PACE provided design-build services for the 5.4 MGD SPA 3 Sewer Lift Station (and force mains) located approximately 1 mile from the WRF. The lift station was originally sited on 0.5 acre; however, PACE was able to reduce the site requirement by 60%, minimizing land acquisition cost. As a stand-alone facility, the lift station includes an emergency generator, odor control, and a control building with remote communication to the WRF.

San Jose Wastewater Treatment Plant – Bisbee, AZ

With funding and grants from the United States Department of Agriculture (USDA), Water Infrastructure Finance Authority of Arizona (WIFA) and the North American Development Bank, the City of Bisbee developed a new wastewater treatment facility (WTF) to replace three outdated existing facilities and meet the City's capacity needs. Mr. Matthews served as Principal / Sr. Project Manager to provide value engineering and redesign the wastewater treatment facility at a capital cost saving of $2.4 million. The WWTP is comprised of a two-basin SBR system with ancillary headworks, solids dewatering, and UV disinfection systems. Operations and maintenance are simplified with a state-of-the-art SCADA and PLC control system that allows the WWTP to be monitored 24 hours a day, seven days a week. The new 1.2 MGD facility is permitted as ADEQ Class B+ treatment, but since facility operations began in February 2006 water quality has consistently been at levels meeting Class A+ standards. PACE was subsequently hired to complete the design of the Photovoltaic (PV) Solar Power Generation System. After the completion of a solar power feasibility study, PACE assisted Bisbee in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 400kW DC photovoltaic system that reduces annual operation and maintenance costs at the plant by approximately 30%. PACE assisted in the feasibility and alternatives analysis, design, permitting, and engineering construction services for the installation of this system. PACE also assisted with the application process to receive the WIFA loan for this renewable energy upgrade and Bisbee was able to obtain the WIFA loan for the entire project cost with $400,000 forgiveness. The system has been in operation since December 2014 and has significantly lowered power costs.

Quartzsite Wastewater Treatment Plant Evaluation and Expansion – Quartzsite, AZ

Mr. Matthews served as the QA/QC Principal Engineer to increase the Quartzsite WWTP capacity from 0.45 MGD to 0.90 MGD. Mr. Matthews provided an in-depth evaluation of the proposed SBR expansion and the existing SBR system, along with all the other existing unit processes. A new second sequential batch reactor (SBR) basin was designed to effectively treat its highly seasonal wastewater flow with better day-to-day treatment performance using significantly less energy.



Sarival Water Reclamation Facility (WRF) - Goodyear, AZ

Mr. Matthews is serving as the Project Manager for this new facility which will treat an average day flow capacity of 4.0 MGD with a maximum day flow capacity of 6.0 MGD and a peak-hour capacity of 10 MGD, providing support to an existing built-out regional WRF for current loading and future flow conditions. The facility will use an MBR treatment process followed by chlorination disinfection to meet Arizona Department of Environmental Quality Title 18 Class A+ requirements for unrestricted reuse of recycled water. The treatment process will consist of an advanced and integrated influent headworks and grit removal and washing system, followed by the advanced Closed Loop Reactor (CLR) secondary treatment process trains, coupled to four membrane separation trains and followed by the sodium hypochlorite disinfection process and chlorine contact basins and effluent reclamation pump station. Effluent from the WRF is designed to go to two discharge points – one sharing a discharge point to an aquifer with another regional facility and the other to a local irrigation district's canal for irrigation use. At full buildout, the design of the WRF will provide an average daily flow capacity of up to eight MGD with a maximum daily capacity of 12 MGD. Future phases of the facility will also introduce an advanced bio-solids processing facility to handle solids processing for multiple treatment plants within the regional area.

Douglas WWTP Solar Addition – Douglas, AZ

Mr. Matthews served as the Principal / QA/QC for the design of the Douglas WWTP Photovoltaic (PV) Solar Power Generation System project. After the completion of a solar power feasibility study, PACE assisted Douglas in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 301.3 kW DC photovoltaic system that will reduce annual operation and maintenance

PRINCIPAL / QA/QC – James Matthews, PE

RELATED EXPERIENCE CONT.

costs at the plant by approximately 30%. PACE assisted the City in the APS Performance Based Incentives and performed APS coordination through the project to receive the WIFA loan for this renewable energy upgrade. Douglas was able to obtain the WIFA loan for the entire project cost with $300,000 forgiveness. The project has been in operation since April 2016 and has significantly reduced the City's power costs.

Tribute Water Reclamation Facility – Sierra Vista, AZ

Mr. Matthews served as Principal / QA /QC for the design of the first phase of a multi-phase water reclamation facility (WRF) with an average wastewater flow of 0.5 million gallons per day (MGD) expandable to an ultimate capacity of 2.0 MGD. The facility is designed to treat wastewater for irrigation reuse and reduce groundwater pumping in the Upper San Pedro Basin Aquifer. The Tribute WRF utilizes the membrane bioreactor (MBR) activated sludge process with UV disinfection. Excess effluent will be recharged to the underlying aquifer for replenishment and groundwater credits. Groundwater recharge is designed to occur through the use of shallow vadose zone wells. A well field adjacent to the WRF consists of three vadose zone wells in the first phase and up to 12 wells at build-out.

Chino Valley WRF Capacity and Expansion Evaluation and Design – Chino Valley, AZ

Mr. Matthews served as Principal/Consulting Engineer for the evaluation of the Town of Chino Valley's Water Reclamation Facility (CVWRF) which treats raw wastewater collected from the Town of Chino Valley, Arizona. Although the CVWRF was satisfying the current permit requirements, the Town recognized a risk of violation with current flow conditions due to daily periods of high inflow and operation at or above industry standard, occasionally reaching 80% of the 0.5 MGD design capacity. As a result, the biological loading rates consistently exceeded the design loading rates for the facility and as such, the secondary treatment process struggled to treat to the permitted limits for Total Nitrogen. PACE performed numerous evaluations, and based on the results of the hydraulic and biological capacity studies, recommended the following minimum improvements across multiple proposed alternatives for flow/load equalization or additional hydraulic and biological capacity to meet current and near-term conditions: add an automated MicroC dosing system at the RAS return to the Anoxic Basins, replace the existing UV system with a new low-pressure high-output inline UV disinfection system, and install an additional sludge dewatering system to provide more dewatering capacity for normal operating conditions and redundancy to accommodate mechanical failures in the system. PACE is currently providing funding assistance, design, and permitting services for the recommended improvements.

Winslow Wastewater Treatment Plant Renovations – Winslow, AZ

PACE performed an evaluation of the deficiencies of the City of Winslow's WWTP, which was plagued by operational issues, making the effective treatment capacity roughly half of its design capacity of 2.2 MGD. Mr. Matthews served as the Principal / QA/QC and led the Instrumentation and Controls upgrades. He provided key input in the development of a Process, Efficiency, and Alternative Analysis Evaluation, to identify several major process deficiencies, as well as proposed improvements for each that preserved as much of the existing facility as was practical. Mr. Matthews recommended numerous renovations to these processes including the lift station, headworks, flow equalization basin, oxidation ditches, filters, UV disinfection system, effluent pump station, sludge dewatering process, and the SCADA/control system. The plant upgrades also included the replacement of its clarifiers and headworks, modifications to its oxidation ditch with a new aeration and blower system, and a complete overhaul of the plant's support and control infrastructure components.

Tuolumne Utilities District Sonora Regional WWTP Upgrades – Sonora, CA

The Sonora Regional Wastewater Treatment Facility (SRWWTF) owned by Tuolumne Utilities District was constructed in 1974 and permitted to handle 2.6 MGD (million gallons per day) average dry weather flow rate. This facility also receives septage from the Tuolumne County. In recent years, the treated water quality was observed by district operational staff, and seasonal variation in biomass growth was noticed on trickling filters. Based on the treatment plant discharge permit, treatment scheme should achieve a 30-day average BOD and TSS (Total suspended solids) levels of less than 30 mg/L. However, summer operations in tricking filters followed by secondary clarification demonstrated a reduction in system performance specifically in BOD and TSS reduction. Mr. Matthews served as the Principal / QA/QC leading to concepts to retrofit the existing open pond into Parkson "Biolac®" basins containing modern swing air diffusers with hydraulic retention times of 24-36 hours, with more efficient waste processing and flexibility with varying inflows. This upgraded Biolac system freeboard in the secondary process allows equalization of flows within the basin, eliminating the need for offline equalization, as well as providing the ability to treat lower flows when the basin level was decreased intentionally. As a result, this new process will enhance processing capacity, performance, efficiency, and optimization.

wastewater consulting engineer

Duong Do, PE, F.ASCE

EDUCATION
BS Environmental Engineering, California Polytechnic University, San Luis Obispo, CA

YEARS OF EXPERIENCE
28 Years
Joined PACE in 2000
With others over 4 years

LICENSE/REGISTRATIONS
Professional Engineer / AZ – 2003 / 40050
Professional Engineer / CA – 2002 / C62802

AFFILIATIONS
Fellow of the American Society of Civil Engineers (F.ASCE)
Water Environment Federation (WEF)

PRESENTATIONS
"Solar Application for Water and Wastewater Treatment Facilities" – AZWater Conference, 2016

Value Engineering Improves Water Quality and Reduces Capital and Operational Costs" – APWA Conference, 2015

Low Pressure Membranes – PEARL/PACE Internal Training Program, 2007

Duong Do is a technical expert in civil and environmental engineering with experience spanning back to 1996. His areas of expertise include water and wastewater treatment processes and design; water and wastewater distribution and collection; water and wastewater infrastructure, storage, and pump station design; effluent recharge design and implementation; and water resource master planning and permitting. Mr. Do has served as the Engineer-of-Record and Project Manager for numerous potable water and wastewater infrastructure projects throughout the Southwestern U.S., including several award-winning facilities. As a former WWTP operator, he has dedicated himself to operator-focus designs, value engineering, and energy efficiency improvements. As a Vice-President of the Environmental Water Division, his current responsibilities include managing design and engineering of water and wastewater treatment, storage, and conveyance projects.

RELATED EXPERIENCE

San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ

Mr. Do served as Principal / QA/QC to perform an evaluation of the City of San Luis East Wastewater Treatment Plant (WWTP) and West WWTP to identify limiting factors that could impede the facilities from meeting current and projected demand. The assessment identified treatment capacity deficiencies, developed a conceptual process expansion, and estimated the time and cost needed for improvement projects. Based on the results of the evaluation, PACE designed improvements to the East WWTP to address deficiencies associated with the headworks and chlorine contact basins, including an effluent piping modification to improve chlorine and effluent contact mixing and reduce effluent retention time. The West WWTP is being converted to a new membrane bioreactor (MBR) activated sludge process to achieve a 3.0 MGD treatment capacity.

SPA 2 Water Reclamation Facility and Effluent Management – Surprise, AZ

Mr. Do served as Project Manager for the SPA 2 WRF and SPA 2 Effluent Storage, Reuse and Recharge System design/build projects where PACE was the Engineer-of-Record. The projects include the design of a 1.2 MGD WRF that will produce high quality effluent meeting Arizona Title 18 Class A+ Reclaimed Water Standards and the effluent disposal system that incorporates storage, reuse and recharge. Effluent is to be reused within the new Asante Development. As part of the design, PACE developed an effluent management plan with a water balance analysis that helped sized the 1.3-million-gallon effluent storage basin, the 5,600 gpm peak capacity effluent pump station, and the vadose zone recharge wells. The effluent distribution system is phased to allow for expansion as the development grows and to reduce upfront capital and O&M costs. Due to site constraints for future WRF expansion and no authorization to discharge to neighboring waterways, PACE recommended the use of vadose zone wells as an alternative to dispose of effluent and recharge the underlying groundwater aquifer. In addition to the vadose zone wells, a small percolation basin is also designed to recharge effluent from the ground surface and provide a backup to the vadose zone wells.

SPA 3 Water Reclamation Facility and Effluent Management – Surprise, AZ

Mr. Do served as Project Manager to provide design build services for a new water reclamation facility servicing the Austin Ranch and surrounding Communities in the SPA 3 region located in Surprise, AZ. The WRF was designed with state-of-the-art technology from the top equipment manufacturers and features Huber Fine Screens, Kaeser Blowers, Ozonia UV Disinfection, Flygt Pumps and Mixers and Aqua-Aerobic Cloth Filters. Effluent is recharged through percolation basins that meet AZ Title 18 Class A+ Reclaimed Water Quality Standards. The SPA 3 WRF has been successfully operating since 2010. In addition to the WRF, PACE provided design-build services for the 5.4 MGD SPA 3 Sewer Lift Station (and force mains) located approximately 1 mile from the WRF. The lift station was originally sited on 0.5 acre; however, PACE was able to reduce the site

WASTEWATER CONSULTING ENGINEER – Duong T. Do, PE, F.ASCE

RELATED EXPERIENCE CONT.

requirement by 60%, minimizing land acquisition cost. As a stand-alone facility, the lift station includes an emergency generator, odor control, and a control building with remote communication to the WRF.

Tri-City Regional Sanitary District Phase 1, 2 & 3 Wastewater Collection System & Water Reclamation Facility – Gila County, AZ

Mr. Do is serving as the Consulting Engineer for Phases 1, 2 & 3 of a new regional wastewater system for the Tri-City Regional Sanitary District (TRSD). TRSD encompasses over five square miles of residential, commercial, and industrial property in Gila County, AZ. The majority of the homes currently use cesspools and septic systems for wastewater disposal. Over 80% of these systems are functioning below ideal performance and some are completely out-of-service. The proposed project will abandon existing cesspools and septic systems and install of 8-10" sewer pipeline, lift stations, and a new MBR water reclamation facility that will serve approximately 4,200 residents.

San Jose Wastewater Treatment Plant – Bisbee, AZ

With funding and grants from the United States Department of Agriculture (USDA), Water Infrastructure Finance Authority of Arizona (WIFA) and the North American Development Bank, the City of Bisbee developed a new wastewater treatment facility (WTF) to replace three outdated existing facilities and meet the City's capacity needs. Mr. Do served as Sr. Consulting Engineer for the design of the Photovoltaic (PV) Solar Power Generation System. After the completion of a solar power feasibility study, PACE assisted Bisbee in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 400kW DC photovoltaic system that reduces annual operation and maintenance costs at the plant by approximately 30%. PACE assisted in the feasibility and alternatives analysis, design, permitting, and engineering construction services for the installation of this system. PACE also assisted with the application process to receive the WIFA loan for this renewable energy upgrade and Bisbee was able to obtain the WIFA loan for the entire project cost with $400,000 forgiveness. The system has been in operation since December 2014 and has significantly lowered power costs.

Quartzsite WWTP Upgrades – Quartzsite, AZ

As Engineer-of- Record, Duong Do led the design team for the expansion of this existing 0.45 MGD SBR WWTP. The design upgrades included increasing the capacity to 0.9 MGD, improving water quality, process redundancy, and reducing operating costs. The challenge of the project was to provide a design that could be implemented within a 7-month window while maintaining treatment without the use of the existing single-basin SBR. Mr. Do developed a transition plan that converted the existing digester into a temporary SBR, while the existing single-basin SBR was upgraded to a two-basin SBR and equipped with new fine bubble aeration that is coupled with (3) 100 HP high-speed, hybrid screw blowers. The project also included upgrades to the influent lift station, headworks screening, chlorine gas disinfection system, and the onsite reuse pump system. The Quartzsite WWTP was awarded the 2020 APWA Project of the Year Award -Small Cities/ Rural Communities and the 2020 AZ Water Association Treatment Plant of the Year – Small Systems.

Sarival Water Reclamation Facility – Goodyear, AZ

Mr. Do served as the Principal Process QA/QC to provide design review for the secondary CLR process for this new facility which will treat an average day flow capacity of 4.0 MGD with a maximum day flow capacity of 6.0 MGD and a peak-hour capacity of 10 MGD, providing support to an existing built-out regional WRF for current loading and future flow conditions. The facility uses an MBR treatment process followed by chlorination disinfection to meet Arizona requirements for unrestricted reuse of recycled water. The treatment process consists of an advanced and integrated influent headworks and grit removal and washing system, followed by the advanced Closed Loop Reactor (CLR) secondary treatment process trains, coupled to four membrane separation trains and followed by the sodium hypochlorite disinfection process and chlorine contact basins and effluent reclamation pump station. Effluent from the WRF is designed to go to two discharge points – one sharing a discharge point to an aquifer with another regional facility and the other to a local irrigation district's canal for irrigation use. At full buildout, the design of the WRF will provide an average daily flow capacity of up to 8.0 MGD with a maximum daily capacity of 12.0 MGD

WASTEWATER CONSULTING ENGINEER – Duong T. Do, PE, F.ASCE

RELATED EXPERIENCE CONT.

Douglas WWTP Solar Addition – Douglas, AZ

Mr. Do served as the Sr. Project Engineer for the design of the Douglas WWTP Photovoltaic (PV) Solar Power Generation System project. After the completion of a solar power feasibility study, PACE assisted Douglas in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 301.3 kW DC photovoltaic system that will reduce annual operation and maintenance costs at the plant by approximately 30%. PACE assisted the City in the APS Performance Based Incentives and performed APS coordination through the project to receive the WIFA loan for this renewable energy upgrade. Douglas was able to obtain the WIFA loan for the entire project cost with $300,000 forgiveness. The project has been in operation since April 2016 and has significantly reduced the City's power costs.

Sierra Vista EOP Water Reclamation Facility – Sierra Vista, AZ

As Engineer-of-Record, Mr. Do provided complete design of the facility, including overall project coordination, process evaluation and design, plan development, and permitting for the City's Environmental Operations Park (EOP), a 4 MGD multi-cell advanced secondary lagoon treatment system. Through the evaluation process, Mr. Do identified improvements to modify the existing lagoons to a biological nutrient removal system utilizing the Modified Ludzack-Ettinger (MLE) activated sludge process. The modification is designed to improve the treatment process performance and reliability to comply with current effluent requirements, reduce power consumption and operational costs, and reduce capital costs. Key upgrades include new headworks, grit removal, and septage receiving station, retrievable fine bubble aeration system coupled with (3) high-speed turbo blowers, aerobic digester, sludge dewatering press, and a 5-acre Class A Biosolids Composting facility. The City of Sierra Vista WWTP was awarded the 2014 APWA Public Works Project of the Year.

Patagonia WWTP Improvements – Patagonia, AZ

Mr. Do served as Principal for the 110,000 gallons per day (GPD) wastewater treatment plant (WWTP) that serves approximately 913 people in the community. Key components of the plant needed rehabilitation in order to improve process efficiencies, leading to operational cost savings. The facility was originally constructed of precast concrete wall panels and was leaking water through the joints between precast panels. These leaks posed a significant risk to the Town for potentially discharging untreated water to Sonoita Creek. In addition, the facility was constructed of a single process train without redundancy or the ability to isolate individual basins. As a result, the Town hired PACE to provide upgrades to the primary aeration blower, anoxic chamber agitator motor, headworks auger, belt press, blower/belt press separation, and chemical building with a focus on improving energy efficiency for the secondary process treatment train. PACE was also able to upgrade to a fine bubble aeration system with dissolved oxygen control which reduced the energy cost by 50%. These proactive steps promote both environmental and economic sustainability while producing high-quality effluent in a cost-effective manner. The Town was able to use grant funding to finance the project and the O&M savings will financially benefit the full-time residents and promote future development in the Town. The project has recently been recognized with the APWA 2023 Project of the Year: Small Cities/Rural Communities-Environment and the Metropolitan Pima Alliance Common Ground Award.

Valley Vista Wastewater Collection System – Somerton, AZ

Duong Do served as the Engineer-of-Record for the design of a new lift station and installation of a new sewer collection system that redirect flows to the newly upgraded Somerton WWTP. The new lift station was constructed adjacent to the existing lift station to minimize infrastructure costs, such as connective piping and electrical services. The system required 8,700 linear feet of pipe to traverse from the Valley Vista WWTP Lift Station to the Somerton WWTP.

sr. project engineer

Taylor B. Pierce, PE

EDUCATION
BS Civil Engineering Arizona State University - 2012
Magna Cum Laude

YEARS OF EXPERIENCE
13 years
Joined PACE in 2011
With others more than 2 years

LICENSE/REGISTRATIONS
Professional Engineer / AZ – 2019 / 70097
Professional Engineer / CA – 2015 / 84580
Professional Engineer / CO – 2017 / 52801
Professional Engineer / KS – 2018 / 26632
Water Treatment Operator T2 California (2016/ 38811)
Wastewater Treatment Operator Grade 4 Arizona (2022/ OP048247)

AFFILIATIONS
Chi Epsilon – Honor Society
American Public Works Association (APWA)
AZ Water

Taylor Pierce has Civil Engineering experience spanning back to 2011. His experience includes design of wastewater treatment plants, sewer / potable / reclaimed pump stations, water treatment, and storage design. Mr. Pierce has developed several equipment performance-based equipment specifications for process equipment selection prior to design, and the creation of operation and maintenance manuals for several wastewater and water conveyance and treatment systems and facilities. His construction administration responsibilities include observation and inspection of fieldwork to ensure general compliance with the design. Mr. Pierce is adept in coordinating project plans, specifications, and reports with multiple consultants to obtain an efficient buildable and operable system. He is proficient in AutoCAD, as well as familiar with construction estimating and project scheduling.

RELATED EXPERIENCE

San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ

Mr. Pierce served as Project Engineer to perform an evaluation of the City of San Luis East Wastewater Treatment Plant (WWTP) and West WWTP to identify limiting factors that could impede the facilities from meeting current and projected demand. The assessment identified treatment capacity deficiencies, developed a conceptual process expansion, and estimated the time and cost needed for improvement projects. Based on the results of the evaluation, PACE designed improvements to the East WWTP to address deficiencies associated with the headworks and chlorine contact basins, including an effluent piping modification to improve chlorine and effluent contact mixing and reduce effluent retention time. The West WWTP is being converted to a new membrane bioreactor (MBR) activated sludge process to achieve a 3.0 MGD treatment capacity.

Tri-City Regional Sanitary District Phase 1, 2 & 3 Wastewater Collection System & Water Reclamation Facility – Gila County, AZ

Mr. Pierce is serving as a Project Engineer for Phases 1, 2 & 3, respectively, of a new regional wastewater system for the Tri-City Regional Sanitary District (TRSD). TRSD encompasses over five square miles of residential, commercial, and industrial property in Gila County, AZ. The majority of the homes currently use cesspools and septic systems for wastewater disposal. Over 80% of these systems are functioning below ideal performance and some are completely out-of-service. The proposed project will abandon existing cesspools and septic systems and install of 8-10" sewer pipeline, lift stations, and a new MBR water reclamation facility that will serve approximately 4,200 residents.

San Jose Wastewater Treatment Plant Solar and Equipment Bay Addition – Bisbee, AZ

This project included the addition of a solar-mounted equipment bay/wash-down structure. PACE worked with the City to secure project funding assistance through WIFA Grants and Loans and energy incentive rebates through the local electrical utility. Mr. Pierce oversaw services during construction and as Project Field Engineer, Mr. Pierce observed, inspected, and reported construction progress to ensure that the project was completed before incentive deadlines.

Sarival Water Reclamation Facility – Goodyear, AZ

Mr. Pierce is serving as the Construction Services Project Manager for the construction phase of this new facility which will treat an average day flow capacity of 4.0 MGD with a maximum day flow capacity of 6.0 MGD and a peak-hour capacity of 10 MGD, providing support to an existing built out regional WRF for current loading and future flow conditions. The facility will use an MBR treatment process followed by chlorination disinfection to meet Arizona Department of Environmental Quality Title 18 Class A+

SR. PROJECT ENGINEER – Taylor Pierce, PE

RELATED EXPERIENCE CONT.

requirements for unrestricted reuse of recycled water. The treatment process consists of an advanced and integrated influent headworks and grit removal and washing system, followed by the advanced Closed Loop Reactor (CLR) secondary treatment process trains, coupled to four membrane separation trains and followed by the sodium hypochlorite disinfection process and chlorine contact basins and effluent reclamation pump station. Effluent from the WRF is designed to go to two discharge points – one sharing a discharge point to an aquifer with another regional facility and the other to a local irrigation district's canal for irrigation use. At full buildout, the design of the WRF will provide an average daily flow capacity of up to 8.0 MGD with a maximum daily capacity of 12.0 MGD. Future phases of the facility will also introduce an advanced bio-solids processing facility to handle solids processing for multiple treatment plants within the regional area.

Douglas WWTP Solar Addition – Douglas, AZ

Mr. Pierce served as the design engineer and project field engineer during the 247kW AC photovoltaic system addition to the Douglas WWTP. The project includes the addition of a solar-mounted multi-use structure. PACE is working with the City on this project to secure project funding assistance through WIFA Grants and Loans and energy incentive rebates through the local electrical utility. Mr. Pierce provided design, bid, and construction services. In addition, as the project field engineer, Mr. Pierce is responsible for observing, inspecting, and reporting construction progress to ensure that the project is completed before incentive deadlines.

Sierra Vista EOP Process Improvements – Sierra Vista, AZ

Mr. Pierce developed the Operation and Maintenance Manual for the City of Sierra Vista's Environmental Operations Park (EOP) WWTP Process Improvements. Mr. Pierce also researched and developed the bio-solids composting plan and disposal methods for the EOP, a 4 MGD multi-cell advanced secondary lagoon treatment system. The bio-solids composting facility provided the City with an economical reuse of dewatered bio-solids. The overall process improvements increased the facility treatment process performance and reliability to comply with current and potential future effluent requirements, significantly reduced power consumption and operational costs, and reduced capital costs by requiring fewer construction components which allowed the project to be implemented quickly.

Patagonia WWTP Improvements – Patagonia, AZ

Mr. Pierce served as the Engineer-of-Record for the 110,000 gallons per day (GPD) wastewater treatment plant (WWTP) that serves approximately 913 people in the community. Key components of the plant needed rehabilitation in order to improve process efficiencies, leading to operational cost savings. The facility was originally constructed of precast concrete wall panels and was leaking water through the joints between precast panels. These leaks posed a significant risk to the Town for potentially discharging untreated water to Sonoita Creek. In addition, the facility was constructed of a single process train without redundancy or the ability to isolate individual basins. As a result, the Town hired PACE to provide upgrades to the primary aeration blower, anoxic chamber agitator motor, headworks auger, belt press, blower/belt press separation, and chemical building with a focus on improving energy efficiency for the secondary process treatment train. PACE was also able to upgrade to a fine bubble aeration system with dissolved oxygen control which reduced the energy cost by 50%. These proactive steps promote both environmental and economic sustainability while producing high-quality effluent in a cost-effective manner. The Town was able to use grant funding to finance the project and the O&M savings will financially benefit the full-time residents and promote future development in the Town. The project has recently been recognized with the APWA 2023 Project of the Year: Small Cities/Rural Communities-Environment and the Metropolitan Pima Alliance Common Ground Award.

Chino Valley WRF Capacity and Expansion Evaluation and Design – Chino Valley, AZ

Mr. Pierce served as Project Manager for the evaluation of the Town of Chino Valley's Water Reclamation Facility (CVWRF) which treats raw wastewater collected from the Town of Chino Valley, Arizona. Although the CVWRF was satisfying the current permit requirements, the Town recognized a risk of violation with current flow conditions due to daily periods of high inflow and operation at or above industry standard, occasionally reaching 80% of the 0.5 MGD design capacity. As a result, the biological loading rates consistently exceeded the design loading rates for the facility and as such, the secondary treatment process struggled to treat to the permitted limits for Total Nitrogen. PACE performed numerous evaluations, and based on the results of the hydraulic and biological capacity studies, recommended the following

SR. PROJECT ENGINEER – Taylor Pierce, PE

RELATED EXPERIENCE CONT.

minimum improvements across multiple proposed alternatives for flow/load equalization or additional hydraulic and biological capacity to meet current and near-term conditions, add an automated MicroC dosing system at the RAS return to the Anoxic Basins, replace the existing UV system with a new low-pressure high-output inline UV disinfection system, and install an additional sludge dewatering system to provide more dewatering capacity for normal operating conditions and redundancy to accommodate mechanical failures in the system. PACE is currently providing funding assistance, design, and permitting services for the recommended improvements.

Winslow Wastewater Treatment Plant Renovations – Winslow, AZ

Mr. Pierce served as the project field engineer during the upgrades to the Winslow WWTP. PACE oversaw the evaluation of existing facilities and analyzed whether the projected growth was better served through improvement of the existing facility or the design and construction of a new treatment facility, and developed a facility phasing plan used to implement the recommended upgrades to the existing plant. Through interviews with operating staff, detailed site visits, and careful analysis of available operating data, PACE identified options that reduced current O&M costs, reduced capital improvement costs, and improved effluent quality without triggering regulatory delays due to existing permits.

BDWID Water System Improvements – Bouse, AZ

Mr. Pierce is serving as the Engineer-of-Record for the Bouse Domestic Water Improvement District (BDWID) Water System Improvements. PACE provided planning, evaluation, and preliminary engineering services to obtain USDA-RD funding for the system improvements. The USDA-RD PER explored distribution lines, a new supply well, treatment processes, a plant site, new water meters, adding sufficient water storage. The USDA-RD has issued a funding package and the project is moving forward to the design phase.

Jerome WWTP Improvements & Sewer Line Extension – Jerome, AZ

Mr. Pierce is serving as the Engineer-of-Record for the Jerome WWTP Improvements & Sewer Line Extension project. The Jerome WWTP is a tertiary treatment facility that is experiencing exceedances of ammonia impact ratio (AIR) as well as some random exceedances for total copper. The existing sewer lines are in dire need of improvements as they have passed their useful life and many are exposed, or under existing structures. The Town pursued and received USDA funding. PACE completed the USDA Preliminary Engineering Report (PER) process to review alternatives and make a recommendation based on 20-year life cycle cost analysis. PACE has been awarded the contract for the design, bidding, construction, and post-construction services for the completion of these improvements. Improvements will include the installation of 2,400 LF of new 10" HDPE gravity sewer pipe, 5 new 48" Manholes, grading of 2,000 LF of new site access roadway, complete flood impact analysis of treatment plant site, installation of a new mechanical screen, a new 90,000 GPD SBR treatment plant and aerobic sludge storage tank, a new dewatering press, a new liquid chlorine system, and providing maintenance access to constructed wetlands.

Show Low Wastewater Treatment Plant Upgrades – Show Low, AZ

Mr. Pierce assisted with the design, permitting, bid, and construction services for the City of Show Low WWTP project. The City commissioned PACE to evaluate and assist in designing and implementing the most appropriate and cost-effective solutions to upgrade and expand the City's existing WWTP. With PACE's design, the treatment capacity will be increased from 1.42 to 2.5 MGD, and will also achieve higher water quality to meet and exceed stringent effluent requirements.

project coordinator / funding / permitting

Andrea Jaycox

EDUCATION
Associates in General Studies,
Paradise Valley Community College

YEARS OF EXPERIENCE
24+ Years
Joined PACE in 2007

With over 24 years experience in engineering, architecture and construciton industries, Mrs. Jaycox has supported projects with PACE for 17 years. She has managed all aspects of project administration for sewer, water, and recycled water systems from project administration and support, contract administration, technical writing, permitting and funding administration / compliance. The majority of the projects have been completed for municpalities and improvement districts in Arizona. She has extensive experience in project management support for multiple projects with numerous simultaneous efforts. She leads funding application and compliance efforts on all Arizona projects, including application content development, maintaining tracking for costs and coordinating billing processes throughout the projects with funding entities such as WIFA, USDA, CBDG, USACE and others.

RELATED EXPERIENCE

Somerton Effluent Management Master Plan – Somerton, AZ

In the interest of exploring the possibility of utilizing non-potable water for irrigation of the local City parks and stormwater detention basins, the City of Somerton commissioned PACE to perform a Park Irrigation Study. Mrs. Jaycox served as Project Coordinator for the study which totals approximately 80 acres of parks. The parks/basins were previously either being irrigated with City potable water/filter backwash from the water treatment plant or not irrigated at all. The study includes an evaluation of non-potable water sources available for irrigation use including the effluent produced in the City of Somerton's 1.8 MGD Wastewater Treatment Plant, non-potable wells, and surface water resources. Since this evaluation is considering the use of effluent, WIFA deems this a green infrastructure improvement and was able to provide Somerton a $21K grant to use toward the development of this study with which PACE assisted the City in the grant application process.

San Luis East and West Wastewater Treatment Plants Evaluations and Upgrades – San Luis, AZ

Mrs. Jaycox served as Project Coordinator on the analysis of the City of San Luis's two existing wastewater treatment plants. The assessment identified treatment capacity deficiencies, developed a conceptual process expansion, and estimated the time and cost needed for improvement projects. Based on the results of the evaluation, PACE designed improvements to the East WWTP to address deficiencies associated with the headworks and chlorine contact basins, including an effluent piping modification to improve chlorine and effluent contact mixing and reduce effluent retention time. The West WWTP is being converted to a new membrane bioreactor (MBR) activated sludge process to achieve a 3.0 MGD treatment capacity.

SPA 2 Water Reclamation Facility and Effluent Reuse – Surprise, AZ

Mrs. Jaycox served as Project Coordinator for the SPA 2 WRF and SPA 2 Effluent Storage, Reuse and Recharge System are design/build projects where PACE was the Engineer-of-Record. The projects include the design of a 1.2 MGD WRF that will produce high quality effluent meeting Arizona Title 18 Class A+ Reclaimed Water Standards and the effluent disposal system that incorporates storage, reuse and recharge. Effluent is to be reused within the new Asante Development. As part of the design, PACE developed an effluent management plan with a water balance analysis that helped sized the 1.3-million-gallon effluent storage basin, the 5,600 gpm peak capacity effluent pump station, and the vadose zone recharge wells. Due to site constraints for future WRF expansion and no authorization to discharge to neighboring waterways, PACE recommended the use of vadose zone wells as an alternative to dispose of effluent and recharge the underlying groundwater aquifer. In addition to the vadose zone wells, a small percolation basin is also designed to recharge effluent from the ground surface and provide a backup to the vadose zone wells.

PROJECT COORDINATOR / FUNDING / PERMITTING – Andrea Jaycox

RELATED EXPERIENCE CONT.

SPA 3 Water Reclamation Facility and Effluent Management – Surprise, AZ

PACE provided design build services for a new water reclamation facility servicing the Austin Ranch and surrounding Communities in the SPA 3 region located in Surprise, AZ. The WRF was designed with state-of-the-art technology from the top equipment manufacturers and features Huber Fine Screens, Kaeser Blowers, Ozonia UV Disinfection, Flygt Pumps and Mixers and Aqua-Aerobic Cloth Filters. Effluent is recharged through percolation basins that meet AZ Title 18 Class A+ Reclaimed Water Quality Standards. The SPA 3 WRF has been successfully operating since 2010. In addition to the WRF, PACE provided design-build services for the 5.4 MGD SPA 3 Sewer Lift Station (and force mains) located approximately 1 mile from the WRF. The lift station was originally sited on 0.5 acre; however, PACE was able to reduce the site requirement by 60%, minimizing land acquisition cost. As a stand-alone facility, the lift station includes an emergency generator, odor control, and a control building with remote communication to the WRF.

Tri-City Regional Sanitary District Phase 1,2 & 3 Wastewater Collection System & Water Reclamation Facility – Gila County, AZ

Mrs. Jaycox served and is serving as the Project Coordinator for Phase 1, 2 & 3, respectively, of a new regional wastewater system for the Tri-City Regional Sanitary District (TRSD). TRSD encompasses over five square miles of residential, commercial and industrial property in Gila County, AZ. The project will abandon existing cesspools and septic systems and install of 8-10" sewer pipeline, lift stations, and a new water reclamation facility that will serve approximately 1,200 residents. Mrs. Jaycox oversees schedule, budget and project deliverables for the team, including subconsultants, providing detailed tracking and documentation of every element of the project. She has also coordinated all USDA-RD and WIFA funding activities, leading the assembly of two PERs, RD Apply online applications and pay applications throughout the project. helping to secure nearly $34M in funding.

San Jose Wastewater Treatment Plant Solar and Equipment Bay Addition – Bisbee, AZ

Mrs. Jaycox served as Project Coordinator for the design of the Photovoltaic (PV) Solar Power Generation System. After the completion of a solar power feasibility study, PACE assisted Bisbee in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 400kW DC photovoltaic system that reduces annual operation and maintenance costs at the plant by approximately 30%. PACE assisted in the feasibility and alternatives analysis, design, permitting, and engineering construction services for the installation of this system. PACE also assisted with the application process to receive the WIFA loan for this renewable energy upgrade and Bisbee was able to obtain the WIFA loan for the entire project cost with $400,000 forgiveness. The system has been in operation since December 2014 and has significantly lowered power costs.

Quartzsite WWTP Upgrades – Quartzsite, AZ

Mrs. Jaycox served as the Project Coordinator for the expansion of this existing 0.45 MGD SBR WWTP. The design upgrades included increasing the capacity to 0.9 MGD, improvement of water quality, process redundancy, and reduced operating cost. Mrs. Jaycox oversaw schedule, budget and project deliverables for the team, including subconsultants, providing detailed tracking and documentation of every element of the project. She has also coordinated all USDA-RD funding activities, helping to secure over $11M in funding by leading the assembly of a PER, the Environmental Assessment (EA), RD Apply online application and pay applications throughout the project. The Quartzsite WWTP was awarded the 2020 APWA Project of the Year Award -Small Cities/ Rural Communities and the 2020 AZ Water Association Treatment Plant of the Year – Small Systems.

Sarival Water Reclamation Facility– Goodyear, AZ

Mrs. Jaycox served as a Project Coordinator for permitting of the Sarival Water Reclamation Facility project. Permits included ADEQ APP, AZPDES, AQD. PACE was a subconsultant to PERC Water for the Design-Build of the facility, and as engineer-of-record, leading the design of an average day flow capacity of 4.0 MGD with a maximum day flow capacity of 6.0 MGD and a peak-hour capacity of 10 MGD. The facility uses an MBR treatment process followed by chlorination disinfection to meet Arizona Department of Environmental Quality Title 18 Class A+ requirements for unrestricted reuse of recycled water.

PROJECT COORDINATOR / FUNDING / PERMITTING – Andrea Jaycox

RELATED EXPERIENCE CONT.

Douglas WWTP Solar Addition – Douglas, AZ

Mrs. Jaycox served as the Project Coordinator for the design of the Douglas WWTP Photovoltaic (PV) Solar Power Generation System project. After the completion of a solar power feasibility study, PACE assisted Douglas in selecting this green solution to offset Arizona Public Service (APS) power costs by the installation of a 301.3 kW DC photovoltaic system that will reduce annual operation and maintenance costs at the plant by approximately 30%. PACE assisted the City in the APS Performance Based Incentives and performed APS coordination through the project to receive the WIFA loan for this renewable energy upgrade. Douglas was able to obtain the WIFA loan for the entire project cost with $300,000 forgiveness. The project has been in operation since April 2016 and has significantly reduced the City's power costs.

Patagonia WWTP Improvements – Patagonia, AZ

The Town of Patagonia owns and operates a 110,000 gallons per day (GPD) wastewater treatment plant (WWTP) that serves approximately 913 people in the community. Key components of the plant needed rehabilitation in order to improve process efficiencies, leading to operational cost savings. The facility was originally constructed of precast concrete wall panels and was leaking water through the joints between precast panels. These leaks posed a significant risk to the Town for potentially discharging untreated water to Sonoita Creek. In addition, the facility was constructed of a single process train without redundancy or the ability to isolate individual basins. As a result, the Town hired PACE to provide upgrades to the primary aeration blower, anoxic chamber agitator motor, headworks auger, belt press, blower/belt press separation, and chemical building with a focus on improving energy efficiency for the secondary process treatment train. PACE was also able to upgrade to a fine bubble aeration system with dissolved oxygen control which reduced the energy cost by 50%. These proactive steps promote both environmental and economic sustainability while producing high-quality effluent in a cost-effective manner. The Town was able to use grant funding to finance the project and the O&M savings will financially benefit the full-time residents and promote future development in the Town. The project has recently been recognized with the APWA 2023 Project of the Year: Small Cities/Rural Communities-Environment and the Metropolitan Pima Alliance Common Ground Award.

Dateland Water Treatment Plant Potable Water Treatment Upgrades – Dateland, AZ

Mrs. Jaycox served as the Project Coordinator for this water treatment project. PACE provided Dateland Public Service Co. with a selection of inland-desalination alternatives, engineering design, environmental permitting, grant funding application services, and construction management to improve and expand their existing groundwater Reverse Osmosis (RO) treatment system. The groundwater in the Dateland basin contains several trace contaminants including arsenic and fluoride, has irrigation inhibitors boron, chloride, and sodium, and overall contains high levels of TDS. The contaminants must be removed to comply with primary and secondary drinking water standards. This project scope included alternative analysis, funding through USDA-RD, & WIFA, performance specifications, final design, permitting, bid services, and construction services. In addition to the mechanical process work, PACE is also providing a preliminary alternative energy evaluation for the use of PV solar systems to power the expanded plant, turning "blue" into "green".

Winslow WWTP Renovations – Winslow, AZ

Mrs. Jaycox served as the Project Coordinator for the evaluation and improvement designs to regain the original plant design capacity of 2.2 MGD. The improvements installed a new combined headworks system consisting of a 6.8 MGD rated, 6mm drum screen with an attached aerated grit chamber and conveyor. The grit removal system consists of an aerated grit chamber installed directly after the drum screen. To promote settling of grit, coarse bubble diffusers installed on one side of the tank promote a spiral mixing pattern where a horizontal screw conveyor moves the collected grit into a centralized hopper. From here an inclined screw conveyor conveys the grit out of the tank for disposal. Mrs. Jaycox coordinated the USDA-RD funding application process, including the development of a Preliminary Engineering Report (PER), which led to an award of $6.6 million in funding.

Somerton WWTP Phase III Expansion – Somerton, AZ

Mrs. Jaycox served as the Project Coordinator for the City of Somerton's wastewater treatment facility expansion from 0.8 MGD to 1.6 MGD. Mrs. Jaycox oversaw schedule, budget and project deliverables for the team, including subconsultants, providing detailed tracking and documentation of every element of the project. She has also coordinated all USDA-RD and WIFA funding activities, leading the assembly of a PER, the EA, RD Apply online application and pay applications throughout the project.

B – REQUIRED FORMS

Proposer's Offer:

Vendor, please complete the requested information below:

Company Name: Pacific Advanced Civil Engineering (PACE)

Contact Person: Michael Krebs

Address: 8723 E. Via de Commercio #A-2004

City, State, Zip Code: Scottsdale, AZ 85258

Telephone No.: (602) 741-2115 (mobile)

Fax No.: (480) 751-1810

E-Mail: mikekrebs@pacewater.com

DEVIATIONS FROM SPECIFICATIONS

Please list all deviations from specifications in the space provided below. Please note the item number of each piece of equipment for which you are showing deviations.

ITEM NO.

None

AFFIDAVIT BY VENDOR
CERTIFYING THAT THERE WAS
NO COLLUSION IN RESPONSE
TO SOLICITATION

STATE OF ARIZONA)
)
CITY OF DOUGLAS)

Michael Krebs
(Name of Individual)

BEING DULY SWORN, DEPOSES AND SAYS:

That he is V.P., Environmental Water Division
(Title)

of Pacific Advanced Civil Engineering (PACE)
(Name of Business)

That Pursuant to Section 34-253 of the Arizona Revised Statutes, he certifies as follows:

That neither he nor anyone associated with said

Pacific Advanced Civil Engineering (PACE)
(Name of Business)

has directly, or indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this project.

Michael Krebs
(Name)

VP Envivo Water
(Title)

PACE
(Name of Business)

Subscribed and sworn to before me this 25 day of September 2024.

My commission Expires:
March 04, 2028

Ipsita Pai
(Notary Public)

IPSITA PAI
Notary Public - State of Arizona
MARICOPA COUNTY
Commission # 665600
Expires March 4, 2028

LOBBYING CERTIFICATION

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-contracts at all tiers and that all sub-contractors shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[**Note**: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, Pacific Advanced Civil Engineering, Inc. (PACE), certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq., apply* to this certification and disclosure, if any.

M D Krebs

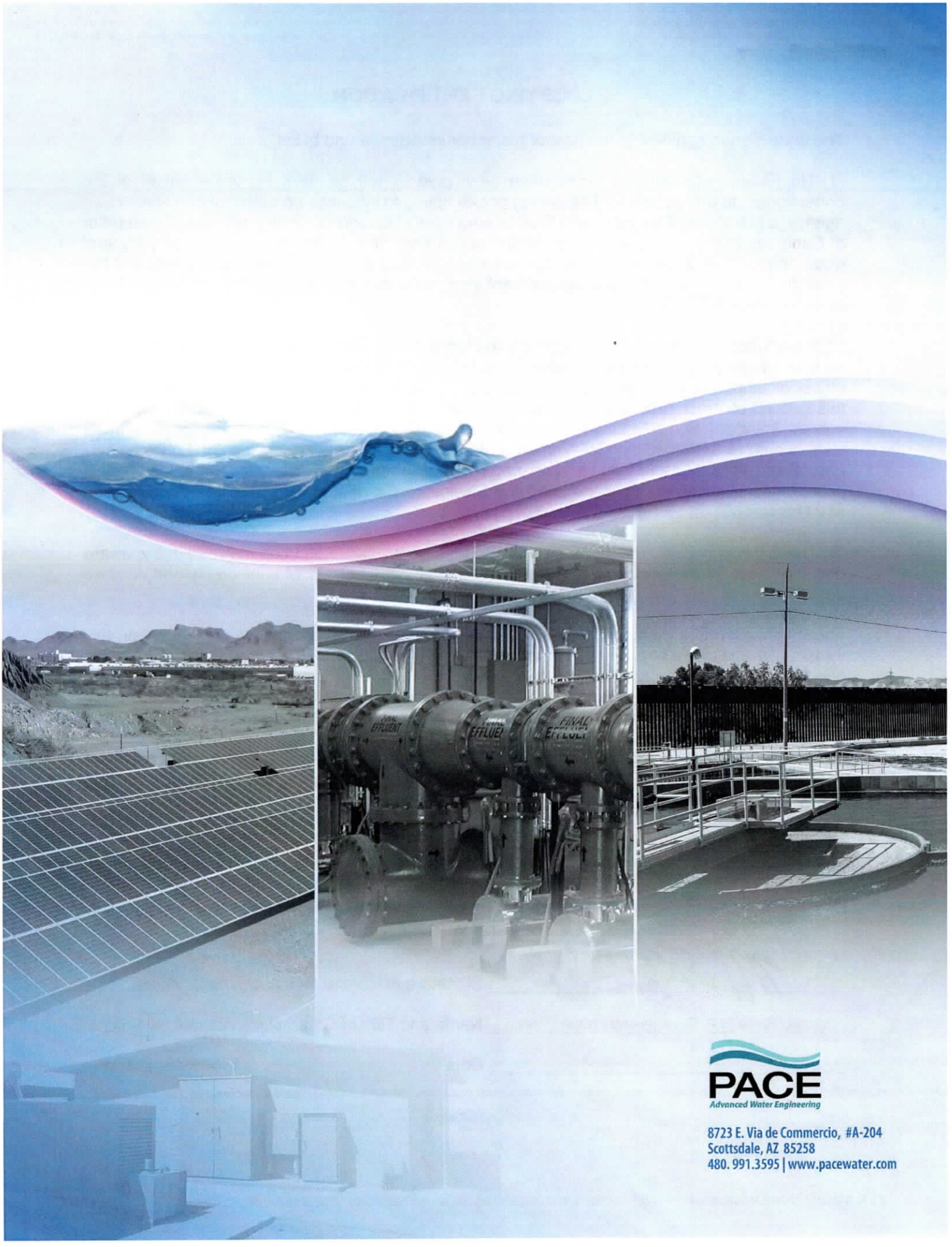
Signature of Contractor's Authorized Official

Michael Krebs, V.P. Environmental Water Division

Name and Title of Contractor's Authorized Official

9/25/24

Date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