Florida's Warmest Welcome

CITY OF POMPANO BEACH
REQUEST FOR LETTERS OF INTEREST
E-28-19

RAW WATER WELL CONSULTING SERVICES

RLI OPENING: July 1, 2019, 2:00 P.M.
PURCHASING OFFICE
1190 N.E. 3RD AVENUE, BUILDING C (Front)
POMPANO BEACH, FLORIDA 33060

May 16, 2019

CITY OF POMPANO BEACH, FLORIDA

REQUEST FOR LETTERS OF INTEREST (RLI)
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RAW WATER WELL CONSULTING SERVICES

Pursuant to Florida Statutes Chapter 287.055 "Consultants' Competitive Negotiation Act" the City of Pompano Beach invites professional hydrogeologic and engineering firms to submit Letters of Interest, qualifications and experience for consideration to provide design study services related to raw water wells.

The City will receive sealed proposals until **2:00 p.m. (local), July 1, 2019**. Proposals must be submitted electronically through the eBid System on or before the due date/time stated above. Any proposal received after the due date and time specified, will not be considered. Any uncertainty regarding the time a proposal is received will be resolved against the Proposer.

Proposer must be registered on the City's eBid System in order to view the solicitation documents and respond to this solicitation. The complete solicitation document can be downloaded for free from the eBid System as a pdf at: https://pompanobeachfl.ionwave.net/CurrentSourcingEvents.aspx. The City is not responsible for the accuracy or completeness of any documentation the Proposer receives from any source other than from the eBid System. Proposer is solely responsible for downloading all required documents. Responses will be electronically unsealed in a public forum and read aloud.

Introduction

1. Scope Of Services

The City intends to issue a single contract to a full service hydrogelogic and engineering, firm to provide professional consulting services to the City for the studies, evaluation, permitting, design and construction management services, including oversite of SRF loan requirements on raw water wells.

The scope of services may include, but is not limited, to the following:

RAW WATER WELLS - Studies, preliminary design, final design, specifications, bid documents, bid analysis, services during construction, start-up services, permitting, regulatory agency liaison, feasibility analysis, special demonstration and pilot projects, and engineering reports related to the rehabilitation, modification, expansion, and/or repair of existing and proposed City owned and operated raw water wells, within the Biscayne and/or Floridan aquifer.

HYDROGEOLOGIC INVESTIGATIONS-Perform analysis and/or modeling of groundwater issues relative to water resources, water quality, wellfield capacity, wellfield protection, contaminant transport modeling, and hydrogeologic permits and consumptive use permit.

HYDROGEOLOGIC SERVICES - Attend various board, community and agency meetings on behalf of the department, and represent the department on technical elements relating to hydrogeologic and water resource issues. Conduct special hydrogeologic projects and studies required by the department.

The Utilities Department plans to study the feasibility of abandoning and relocating raw water wells located in the eastern wellfield. Proposed well locations will require easement procurement for future raw water wells, the required power supply and distribution piping in the western wellfield. Based on findings of this study and determinations made by the City, additional services are required to provide 100% construction document design. These design services may include, but is not limited, to the following: 1) bid specifications, 2) preparation of contract documents for solicitation, 3) bidding assistance, 4) permitting assistance, and 5) construction management services during construction. Funding is available in the current CIP for this study and related design services identified herein. Additional related services will be funded with future CIP funding allocations and/or SRF funding. A final budget has not been established construction.

- Prepare preliminary design reports, feasibility analyses, site plans and/or design alternative recommendations and preliminary cost estimates.

- Conduct presentations to elected officials, staff, and the public.

- Prepare all required bidding and construction documents for the projects. This will include preparing surveys, design plans, supplementary contract requirements, technical specifications, and cost estimates.

- Attendance at City Commission, pre-design, design, bidding and bid award meetings may be required.

- Coordinate processing the projects through all required governmental and quasi-governmental agencies, City Departments and other appropriate review boards.

- Prepare and process all required permit applications and submittal packages as required for permit issuance of all agency permits (i.e. State, County and City)

- Attend pre-bid meeting, respond to bidder questions, and prepare possible bid addendums for project revisions.

- Assist the City in making bid award recommendations for contracting/construction services.

- Provide construction engineering/management services for the projects. Services during construction may include periodic or routine inspections, threshold inspections, shop drawing/contractor submittal reviews and approvals, responding to contractor requests for information, and reviewing contractor payment applications.

- Provide project close-out services. This may include preliminary and final acceptance of projects, preparation and approval of punch list items and project certification as required to all permitting agencies.

Experience

A prime consultant must be a full service hydrogeologic and engineering firm experienced in design and performing studies, similar in scope in Southeast Florida. Specific experience includes providing design and studies on the following: potable water, Aquifer Storage and Recovery systems and monitoring well networks, ground water modeling. Scope consists of design, permitting and construction services with a specific emphasis on projects of similar size and complexity. The successful firm must have experience on the above items and shall be demonstrated by listing a minimum of three previous projects completed prior to the date of this solicitation.

The Prime Consultant shall provide a list of members identifying the team that will work on these projects. The project/contract Manager and the team leaders for key specialties will be listed. Resumes must be provided for all team leaders. The Prime Consultant must include alternates (with similar experience) for the key team leaders in the event a substitution is required.

Provide qualifications that demonstrate the Prime and/or Subconsultant has the minimum experience as listed below:

At least five (5) years of experience in providing professional hydrogeologic/engineering services related to potable water system and well design services in Southeast Florida.

At least three (3) projects in Southeast Florida requiring potable water system hydrologic and/or solute transport modeling experience on systems greater than ten (10) million gallons per day (MGD).

At least three (3) projects in Southeast Florida providing potable water system design, permitting and construction experience on systems greater than ten (10) MGD.

The prime consultant will be ranked according to the scoring criterion attached herein. The scope for each specific task assignments will be identified and associated fees listed.

The term of the contract will be negotiated at the time of the award. No minimum amount of work or compensation will be assured to the retained consultant. The City reserves the right to re-use the work products of the retained consultant and to retain other consultants to provide the same or similar services at its sole discretion.

Firms must have previous municipal experience and must be licensed to practice Professional Engineering in the State of Florida, according to Florida State Statute 471, by the Board of Professional Engineers.

2. Tasks/Deliverables

a. Perform/Provide Feasibility Study
b. Produce Proposed Site Locations (east and west wellfields)
c. Provide 100% Design Documents for Proposed Wells and Associated Appurtenances
d. Evaluate Existing Well Conditions and Provide Rehabilitation Recommendations
e. Provide All Permitting Requirements/Assistance with all Regulatory Agencies
f. Evaluate Consumptive Use Permit
g. Perform Bidding Assistance and Construction Related Services
h. Provide Signed/Sealed Surveys for all Proposed Well Locations

3. Local Business Program

On March 13, 2018, the City Commission approved Ordinance 2018-46, establishing a Local Business Program, a policy to increase the participation of City of Pompano Beach businesses in the City's procurement process.

For purposes of this solicitation, “Local Business” will be defined as follows:

1. **TIER 1 LOCAL VENDOR.** POMPANO BEACH BUSINESS EMPLOYING POMPANO BEACH RESIDENTS. A business entity which has maintained a permanent place of business within the city limits and maintains a staffing level, within this local office, of at least ten percent who are residents of the City of Pompano Beach or includes subcontracting commitments to Local Vendors Subcontractors for at least ten percent of the contract value. The permanent place of business may not be a post office box. The business must be located in a non-residential zone, and must actually distribute goods or services from that location. The business must be staffed with full-time employees within the limits of the city. In addition, the business must have a current business tax receipt from the City of Pompano Beach for a minimum of one year prior to the date of issuance of a bid or proposal solicitation.

2. **TIER 2 LOCAL VENDOR.** BROWARD COUNTY BUSINESS EMPLOYING POMPANO BEACH RESIDENTS OR UTILIZING LOCAL VENDOR SUBCONTRACTORS. A business entity which has maintained a permanent place of business within Broward County and maintains a staffing level, within this local office, of at least 15% who are residents of the City of Pompano Beach or includes subcontracting commitments to Local Vendors Subcontractors for at least 20% of the contract value. The permanent place of business may not be a post office box. The business must be located in a non- residential zone, and must actually distribute goods or services from that location. The business must be staffed with full-time employees within the limits of the city. In addition, the business must have a current business tax receipt from the respective Broward County municipality for a minimum of one year prior to the date of issuance of a bid or proposal solicitation.

3. **LOCAL VENDOR SUBCONTRACTOR.** POMPANO BEACH BUSINESS. A business entity which has maintained a permanent place of business within the city limits of the City of Pompano Beach. The permanent place of business may not be a post office box. The business must be located in a non-residential zone, and must actually distribute goods or services from that location. The business must be staffed with full-time employees within the limits of the city. In addition, the business must have a current business tax receipt from the City of Pompano Beach for a minimum of one year prior to the date of issuance of a bid or proposal solicitation.

You can view the list of City businesses that have a current Business Tax Receipt on the City's website, and locate local firms that are available to perform the work required by the bid specifications. The business information, sorted by business use classification, is posted on the webpage for the Business Tax Receipt Division: www.pompanobeachfl.gov by selecting the Pompano Beach Business Directory in the Shop Pompano! section.

The City of Pompano Beach is **strongly committed** to insuring the participation of City of Pompano Beach Businesses as contractors and subcontractors for the procurement of goods and services, including labor, materials and equipment. Proposers are required to participate in the City of Pompano Beach's Local Business Program by including, as part of their package, the Local Business Participation Form (Exhibit A,) listing the local businesses that will be used on the contract, and the Letter of Intent Form (Exhibit B) from each local business that will participate in the contract.

If a Prime Contractor/Vendor is not able to achieve the level of goal attainment of the contract, the Prime Vendor will be requested to demonstrate and document that good faith efforts were made to achieve the goal by providing the Local Business Unavailability Form (Exhibit C), listing firms that were contacted but not available, and the Good Faith Effort Report (Exhibit D), describing the efforts made to include local business participation in the contract. This documentation shall be provided to the City Commission for acceptance.

The awarded proposer will be required to submit "Local Business Subcontractor Utilization Reports" during projects and after projects have been completed. The reports will be submitted to the assigned City project manager of the project. The Local Business Subcontractor Utilization Report template and instructions have been included in the bid document.

Failure to meet Local Vendor Goal commitments will result in "unsatisfactory" compliance rating. Unsatisfactory ratings may impact award of future projects if a sanction is imposed by the City Commission.

The city shall award a Local Vendor preference based upon vendors, contractors, or subcontractors who are local with a preferences follows:

a. For evaluation purposes, the Tier 1 and Tier 2 businesses shall be a criterion for award in this Request for Proposal (RLI). No business may qualify for more than one tier level.

b. For evaluation purposes, local vendors shall receive the following preferences:

i. Tier 1 business as defined by this subsection shall be granted a preference in the amount of five percent of total score.

ii. Tier 2 business as defined by this subsection shall be granted a preference in the amount of two and one-half percent of total score.

c. It is the responsibility of the awarded vendor/contractor to comply with all Tier 1&2 guidelines. The awarded vendor/contractor must ensure that all requirements are met before execution of a contract.

4. Submission/Format Requirements

Sealed proposals shall be submitted electronically through the eBid System on or before the due date/time stated above. Proposer shall upload response as one (1) file to the eBid System. The file size for uploads is limited to 100 MB. If the file size exceeds 100 MB the response must be split and uploaded as two (2) separate files.

Information to be included in the proposal: In order to maintain comparability and expedite the review process, it is required that proposals be organized in the manner specified below, with the sections clearly labeled:

Title page:
Show the project name and number, the name of the Proposer's firm, address, telephone number, name of contact person and the date.

Table of Contents:
Include a clear identification of the material by section and by page.

Letter of Interest:
A Letter of Interest, signed by an authorized representative of your firm, expressing your understanding of the project and expressing a positive commitment to provide the services described herein. Please limit this section to two pages. In the letter, include:

- complete corporate name of the primary firm responding
- applicable Federal Tax Identification Number
- address
- telephone and fax numbers
- name, title, and email of the person to contact regarding your submission

Technical Approach:
Firms or teams shall submit their technical approach to the tasks described in the scope, including details of how each phase of the project would be completed, and how their firm proposes to maintain time schedules and cost controls.

Schedule:
Proposer shall provide a timeline that highlights proposed tasks that will meet all applicable deadlines.

Project Team Form:
Submit a completed "Project Team" form. The purpose of this form is to identify the key members of your team, including any specialty subconsultants.

Organizational Chart:
Specifically identify the management plan (if needed) and provide an organizational chart for the team. The proposer must describe at a minimum, the basic approach to these projects, to include reporting hierarchy of staff and sub-consultants, clarify the individual(s) responsible for the co-ordination of separate components of the scope of services.

Statement of Skills and Experience of Project Team:
Describe the experience of the entire project team as it relates to the types of projects described in the Scope section of this RLI. Include the experience of the prime consultants as well as other members of the project team; i.e., additional personnel, sub-consultants, branch office, team members, and other resources anticipated to be utilized for this project. Name specific projects (successfully completed within the past five years) where the team members have performed similar projects previously.

Resumes of Key Personnel
Include resumes for key personnel for prime and subconsultants.

References:
References for past three (3) projects in the tri-county area (Broward, Palm Beach, and Miami-Dade.) Describe the scope of each project in physical terms and by cost, describe the respondent's responsibilities, and provide the contact information (name, email, telephone number) of an individual in a position of responsibility who can attest to respondent's activities in relation to the project.

List any prior projects performed for the City of Pompano Beach.

Office Locations:
Identify the location of the office from which services will be rendered, and the number of professional and administrative staff at the prime office location. Also identify the location of office(s) of the prime and/or sub consultants that may be utilized to support any or all of the professional services listed above and the number of professional and administrative staff at the prime office location.

If firms are situated outside the local area, (Broward, Palm Beach, and Miami-Dade counties) include a brief statement as to whether or not the firm will arrange for a local office during the term of the contract, if necessary.

Local Businesses:
Completed Local Business program forms, Exhibits A-D.

Minority Business Enterprises:
It is the intent of the City of Pompano Beach to encourage minority and women owned firms to participate in the process. The methods by which this is accomplished should be developed and presented by the respondents in their submissions.

For any member of your team that is a certified Minority Business Enterprise (as defined by the State of Florida) you must include copies of their certifications for them to be considered toward Item 5 in the evaluation criteria. Complete Exhibit E and include all certificates in your electronic submittal.

Litigation:

Disclose any litigation within the past five (5) years arising out your firm's performance, including status/outcome.

City Forms:
Responses should include all City forms as stated above. Required forms must be completed and submitted electronically through the City's eBid System.

NOTE:
Financial statements that are required as submittals to prequalify for a solicitation will be exempt from public disclosure; however, financial statements submitted to prequalify for a solicitation, and are not required by the City, may be subject to public disclosure.

5. Insurance

CONTRACTOR shall not commence services under the terms of this Agreement until certification or proof of insurance detailing terms and provisions has been received and approved in writing by the CITY's Risk Manager. If you are responding to a bid and have questions regarding the insurance requirements hereunder, please contact the CITY's Purchasing Department at (954) 786-4098. If the contract has already been awarded, please direct any queries and proof of the requisite insurance coverage to CITY staff responsible for oversight of the subject project/contract.

CONTRACTOR is responsible to deliver to the CITY for timely review and written approval/disapproval Certificates of Insurance which evidence that all insurance required hereunder is in full force and effect and which name on a primary basis, the CITY as an additional insured on all such coverage.

Throughout the term of this Agreement, CITY, by and through its Risk Manager, reserve the right to review, modify, reject or accept any insurance policies required by this Agreement, including limits, coverages or endorsements. CITY reserves the right, but not the obligation, to review and reject any insurer providing coverage because of poor financial condition or failure to operate legally.

Failure to maintain the required insurance shall be considered an event of default. The requirements herein, as well as CITY's review or acceptance of insurance maintained by CONTRACTOR, are not intended to and shall not in any way limit or qualify the liabilities and obligations assumed by CONTRACTOR under this Agreement.

Throughout the term of this Agreement, CONTRACTOR and all subcontractors or other agents hereunder, shall, at their sole expense, maintain in full force and effect, the following insurance coverages and limits described herein, including endorsements.

A. Worker's Compensation Insurance covering all employees and providing benefits as required by Florida Statute, Chapter 440. CONTRACTOR further agrees to be responsible for employment, control and conduct of its employees and for any injury sustained by such employees in the course of their employment.

B. Liability Insurance.

(1) Naming the City of Pompano Beach as an additional insured as CITY's interests may appear, on General Liability Insurance only, relative to claims which arise from

CONTRACTOR's negligent acts or omissions in connection with Contractor's performance under this Agreement.

(2) Such Liability insurance shall include the following checked types of insurance and indicated minimum policy limits.

Type of Insurance		Limits of Liability		
GENERAL LIABILITY:		Minimum $1,000,000 Per Occurrence and $2,000,000 Per Aggregate		
* Policy to be written on a claims incurred basis				
XX	comprehensive form	bodily injury and property damage		
XX	premises - operations	bodily injury and property damage		
__	explosion & collapse hazard			
__	underground hazard			
XX	products/completed operations hazard	bodily injury and property damage combined		
XX	contractual insurance	bodily injury and property damage combined		
XX	broad form property damage	bodily injury and property damage combined		
XX	independent contractors	personal injury		
XX	personal injury			
__	sexual abuse/molestation	Minimum $1,000,000 Per Occurrence and Aggregate		
__	liquor legal liability	Minimum $1,000,000 Per Occurrence and Aggregate		
AUTOMOBILE LIABILITY:		Minimum $1,000,000 Per Occurrence and Aggregate. Bodily injury (each person) bodily injury (each accident), Property damage, bodily injury and property damage combined.		
XX	comprehensive form			
XX	owned			
XX	hired			
XX	non-owned			
REAL & PERSONAL PROPERTY				
__	comprehensive form	Agent must show proof they have this coverage.		
EXCESS LIABILITY			Per Occurrence	Aggregate
__	other than umbrella	bodily injury and property damage combined	$1,000,000	$1,000,000
PROFESSIONAL LIABILITY			Per Occurrence	Aggregate
XX	* Policy to be written on a claims made basis		$1,000,000	$1,000,000

(3) If Professional Liability insurance is required, Contractor agrees the indemnification and hold harmless provisions set forth in the Agreement shall survive the termination or expiration of the Agreement for a period of four (4) years unless terminated sooner by the applicable statute of limitations.

CYBER LIABILITY	Per Occurrence	Aggregate
__ * Policy to be written on a claims made basis	$1,000,000	$1,000,000

__ Network Security / Privacy Liability
__ Breach Response / Notification Sublimit (minimum limit of 50% of policy aggregate)
__ Technology Products E&O - $1,000,000 (only applicable for vendors supplying technology related services and or products)
__ Coverage shall be maintained in effect during the period of the Agreement and for not less than four (4) years after termination/ completion of the Agreement.

C. Employer's Liability. If required by law, CONTRACTOR and all subcontractors shall, for the benefit of their employees, provide, carry, maintain and pay for Employer's Liability Insurance in the minimum amount of One Hundred Thousand Dollars ($100,000.00) per employee, Five Hundred Thousand Dollars ($500,000) per aggregate.

D. Policies: Whenever, under the provisions of this Agreement, insurance is required of the CONTRACTOR, the CONTRACTOR shall promptly provide the following:

(1) Certificates of Insurance evidencing the required coverage;

(2) Names and addresses of companies providing coverage;

(3) Effective and expiration dates of policies; and

(4) A provision in all policies affording CITY thirty (30) days written notice by a carrier of any cancellation or material change in any policy.

E. Insurance Cancellation or Modification. Should any of the required insurance policies be canceled before the expiration date, or modified or substantially modified, the issuing company shall provide thirty (30) days written notice to the CITY.

F. Waiver of Subrogation. CONTRACTOR hereby waives any and all right of subrogation against the CITY, its officers, employees and agents for each required policy. When required by the insurer, or should a policy condition not permit an insured to enter into a pre-loss agreement to waive subrogation without an endorsement, then CONTRACTOR shall notify the insurer and request the policy be endorsed with a Waiver of Transfer of Rights of Recovery Against Others, or its equivalent. This Waiver of Subrogation requirement shall not apply to any policy which includes a condition to the policy not specifically prohibiting such an endorsement, or voids coverage should CONTRACTOR enter into such an agreement on a pre-loss basis.

Selection/Evaluation Process

A Selection/Evaluation Committee will be appointed to select the most qualified firm(s). The Selection/Evaluation Committee will present their findings to the City Commission.

The Committee will rank responses based upon the following criteria.

	Criteria	**Point Range**
1	Prior experience of the firm with projects of similar size and complexity: a. Number of similar projects b. Complexity of similar projects c. References from past projects performed by the firm d. Previous projects performed for the City e. Litigation within the past 5 years arising out of firm's performance	0-30
2	Qualifications of personnel including sub consultants: a. Organizational chart for project b. Number of technical staff c. Qualifications of technical staff: (1) Number of licensed staff (2) Education of staff (3) Experience of staff on similar projects	0-20
3	Proximity of the nearest office to the project location: a. Location b. Number of staff at the nearest office	0-10
4	Technical approach to perform the tasks described in the Scope of Services: a. Level of effort b. Effectiveness of the technical approach to complete each phase of the project, maintain time schedules and cost control	0-30
5	Is the firm a certified minority business enterprise as defined by the Florida Small and Minority Business Assistance Act of 1985? (include sub-consultants)	0-10
	Total	**0-100**

Additional 0-5% for Tier1/Tier2 Local Business will be calculated on combined scoring totals of each company.

Value of Work Previously Awarded to Firm (Tie-breaker) - In the event of a tie, the firm with the lowest value of work as a prime contractor on City of Pompano Beach projects within the last five years will receive the higher ranking, the firm with the next lowest value of work shall receive the next highest ranking, and so on. The analysis of past work will be based on the City's Purchase Order and payment records.

The Committee has the option to use the above criteria for the initial ranking to short-list Proposers and to use an ordinal ranking system to score short-listed Proposers following presentations (if deemed necessary) with a score of “1” assigned to the short-listed Proposer deemed most qualified by the Committee.

Each firm should submit documentation that evidences the firm’s capability to provide the services required for the Committee’s review for short listing purposes. After an initial review of the Proposals, the City may invite Proposers for an interview to discuss the proposal and meet firm representatives, particularly key personnel who would be assigned to the project. Should interviews be deemed necessary, it is understood that the City shall incur no costs as a result of this interview, nor bear any obligation in further consideration of the submittal.

When more than three responses are received, the committee shall furnish the City Commission (for their approval) a listing, in ranked order, of no fewer than three firms deemed to be the most highly qualified to perform the service. If three or less firms respond to the RLI, the list will contain the ranking of all responses.

The City Commission has the authority to (including, but not limited to); approve the recommendation; reject the recommendation and direct staff to re-advertise the solicitation; or, review the responses themselves and/or request oral presentations and determine a ranking order that may be the same or different from what was originally presented to the City Commission.

6. Hold Harmless and Indemnification

Proposer covenants and agrees that it will indemnify and hold harmless the City and all of its officers, agents, and employees from any claim, loss, damage, cost, charge or expense arising out of any act, action, neglect or omission by the Proposer, whether direct or indirect, or whether to any person or property to which the City or said parties may be subject, except that neither the Proposer nor any of its subcontractors will be liable under this section for damages arising out of injury or damage to persons or property directly caused by or resulting from the sole negligence of the City or any of its officers, agents or employees.

7. Right to Audit

Contractor's records which shall include but not be limited to accounting records, written policies and procedures, computer records, disks and software, videos, photographs, subcontract files (including proposals of successful and unsuccessful bidders), originals estimates, estimating worksheets, correspondence, change order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to this contract (all the foregoing hereinafter referred to as "records") shall be open to inspection and subject to audit and/or reproduction, during normal working hours, by Owner's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification

of any invoices, payments or claims submitted by the contractor or any of his payees pursuant to the execution of the contract. Such records subject to examination shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with this contract.

For the purpose of such audits, inspections, examinations and evaluations, the Owner's agent or authorized representative shall have access to said records from the effective date of this contract, for the duration of the Work, and until 5 years after the date of final payment by Owner to Consultant pursuant to this contract.

Owner's agent or its authorized representative shall have access to the Contractor's facilities, shall have access to all necessary records, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this article. Owner's agent or its authorized representative shall give auditees reasonable advance notice of intended audits.

Contractor shall require all subcontractors, insurance agents, and material suppliers (payees) to comply with the provisions of this article by insertion of the requirements hereof in any written contract agreement. Failure to obtain such written contracts which include such provisions shall be reason to exclude some or all of the related payees' costs from amounts payable to the Contractor pursuant to this contract.

8. <u>Retention of Records and Right to Access</u>

The City of Pompano Beach is a public agency subject to Chapter 119, Florida Statutes. The Contractor shall comply with Florida's Public Records Law, as amended. Specifically, the Contractor shall:

a. Keep and maintain public records required by the City in order to perform the service;

b. Upon request from the City's custodian of public records, provide the City with a copy of requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes or as otherwise provided by law;

c. Ensure that public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law;

d. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the Contractor does not transfer the records to the City; and

e. Upon completion of the contract, transfer, at no cost to the City, all public records in possession of the Contractor, or keep and maintain public records required by the City to perform the service. If the Contractor transfers all public records to the City upon completion of the contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of the contract, the Contractor shall meet all applicable requirements for retaining public records. All

records stored electronically must be provided to the City, upon request from the City's custodian of public records in a format that is compatible with the information technology systems of the City.

9. Communications

No negotiations, decisions, or actions shall be initiated or executed by the firm as a result of any discussions with any City employee. Only those communications, which are in writing from the City, may be considered as a duly authorized expression on behalf of the City. In addition, only communications from firms that are signed and in writing will be recognized by the City as duly authorized expressions on behalf of firms.

10. No Discrimination

There shall be no discrimination as to race, sex, color, age, religion, or national origin in the operations conducted under any contract with the City.

11. Independent Contractor

The selected firm will conduct business as an independent contractor under the terms of this contract. Personnel services provided by the firm shall be by employees of the firm and subject to supervision by the firm, and not as officers, employees, or agents of the City. Personnel policies, tax responsibilities, social security and health insurance, employee benefits, purchasing policies and other similar administrative procedures applicable to services rendered under this agreement shall be those of the firm.

12. Staff Assignment

The City of Pompano Beach reserves the right to approve or reject, for any reasons, Proposer's staff assigned to this project at any time. Background checks may be required.

13. Contract Terms

The contract resulting from this RLI shall include, but not be limited to the following terms:

The contract shall include as a minimum, the entirety of this RLI document, together with the successful Proposer's proposal. Contract shall be prepared by the City of Pompano Beach City Attorney.

If the City of Pompano Beach defends any claim, demand, cause of action, or lawsuit arising out of any act, action, negligent acts or negligent omissions, or willful misconduct of the contractor, its employees, agents or servants during the performance of the contract, whether directly or indirectly, contractor agrees to reimburse the City of Pompano Beach for all expenses, attorney's fees, and court costs incurred in defending such claim, cause of action or lawsuit.

14. Waiver

It is agreed that no waiver or modification of the contract resulting from this RLI, or of any covenant, condition or limitation contained in it shall be valid unless it is in writing and duly executed by the party to be charged with it, and that no evidence of any waiver or modification shall be offered or received in evidence in any proceeding, arbitration, or litigation between the parties arising out of or affecting this contract, or the right or obligations of any party under it, unless such waiver or modification is in writing, duly executed as above. The parties agree that the provisions of this paragraph may not be waived except by a duly executed writing.

15. Survivorship Rights

This contract resulting from this RLI shall be binding on and inure to the benefit of the respective parties and their executors, administrators, heirs, personal representative, successors and assigns.

16. Termination

The contract resulting from this RLI may be terminated by the City of Pompano Beach without cause upon providing contractor with a least sixty (60) days prior written notice.

Should either party fail to perform any of its obligations under the contract resulting from this RLI for a period of thirty (30) days after receipt of written notice of such failure, the non-defaulting part will have the right to terminate the contract immediately upon delivery of written notice to the defaulting part of its election to do so. The foregoing rights of termination are in addition to any other rights and remedies that such party may have.

17. Manner of Performance

Proposer agrees to perform its duties and obligations under the contract resulting from this RLI in a professional manner and in accordance with all applicable local, federal and state laws, rules and regulations.

Proposer agrees that the services provided under the contract resulting from this RLI shall be provided by employees that are educated, trained and experienced, certified and licensed in all areas encompassed within their designated duties. Proposer agrees to furnish the City of Pompano Beach with all documentation, certification, authorization, license, permit, or registration currently required by applicable laws or rules and regulations. Proposer further certifies that it and its employees are now in and will maintain good standing with such governmental agencies and that it and its employees will keep all license, permits, registration, authorization or certification required by applicable laws or regulations in full force and effect during the term of this contract. Failure of Proposer to comply with this paragraph shall constitute a material breach of contract.

18. Acceptance Period

Proposals submitted in response to this RLI must be valid for a period no less than ninety (90) days from the closing date of this solicitation.

19. RLI Conditions and Provisions

The completed proposal (together with all required attachments) must be submitted electronically to City on or before the time and date stated herein. All Proposers, by electronic submission of a proposal, shall agree to comply with all of the conditions, requirements and instructions of this RLI as stated or implied herein. All proposals and supporting materials submitted will become the property of the City.

Proposer's response shall not contain any alteration to the document posted other than entering data in spaces provided or including attachments as necessary. By submission of a response, Proposer affirms that a complete set of bid documents was obtained from the eBid System or from the Purchasing Division only and no alteration of any kind has been made to the solicitation. Exceptions or deviations to this solicitation may not be added after the submittal date.

All Proposers are required to provide all information requested in this RLI. Failure to do so may result in disqualification of the proposal.

The City reserves the right to postpone or cancel this RLI, or reject all proposals, if in its sole discretion it deems it to be in the best interest of the City to do so.

The City reserves the right to waive any technical or formal errors or omissions and to reject all proposals, or to award contract for the items herein, in part or whole, if it is determined to be in the best interests of the City to do so.

The City shall not be liable for any costs incurred by the Proposer in the preparation of proposals or for any work performed in connection therein.

20. Standard Provisions

a. Governing Law

Any agreement resulting from this RLI shall be governed by the laws of the State of Florida, and the venue for any legal action relating to such agreement will be in Broward County, Florida.

b. Licenses

In order to perform public work, the successful Proposer shall:
Be licensed to do business in Florida, if an entity, and hold or obtain such Contractor' and Business Licenses if required by State Statutes or local ordinances.

c. Conflict of Interest

For purposes of determining any possible conflict of interest, each Proposer must disclose if any Elected Official, Appointed Official, or City Employee is also an owner, corporate officer, or an employee of the firm. If any Elected Official, Appointed Official, or City Employee is an owner, corporate officer, or an employee, the Proposer must file a statement with the Broward County Supervisor of Elections pursuant to §112.313, Florida Statutes.

d. Drug Free Workplace

The selected firm(s) will be required to verify they will operate a "Drug Free Workplace" as set forth in Florida Statute, 287.087.

e. Public Entity Crimes

A person or affiliate who has been placed on the convicted vendor list following a conviction for public entity crime may not submit a proposal on a contract to provide any goods or services to a public entity, may not submit a proposal on a contract with a public entity for the construction or repair of a public building or public work, may not submit proposals on leases of real property to public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Florida Statute, Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

f. Patent Fees, Royalties, And Licenses

If the selected Proposer requires or desires to use any design, trademark, device, material or process covered by letters of patent or copyright, the selected Proposer and his surety shall indemnify and hold harmless the City from any and all claims for infringement by reason of the use of any such patented design, device, trademark, copyright, material or process in connection with the work agreed to be performed and shall indemnify the City from any cost, expense, royalty or damage which the City may be obligated to pay by reason of any infringement at any time during or after completion of the work.

g. Familiarity with Laws

It is assumed the selected firm(s) will be familiar with all federal, state and local laws, ordinances, rules and regulations that may affect its services pursuant to this RLI. Ignorance on the part of the firm will in no way relieve the firm from responsibility.

h. Withdrawal of Proposals

A firm may withdraw its proposal without prejudice no later than the advertised deadline for submission of proposals by written communication to the General Services Department, 1190 N.E. 3rd Avenue, Building C, Pompano Beach, Florida 33060.

i. Composition of Project Team

Firms are required to commit that the principals and personnel named in the proposal will perform the services throughout the contractual term unless otherwise provided for by way of a negotiated contract or written amendment to same executed by both parties. No diversion or substitution of principals or personnel will be allowed unless a written request that sets forth the qualifications and experience of the proposed replacement(s) is submitted to and approved by the City in writing.

j. Invoicing/Payment

All invoices should be sent to City of Pompano Beach, Accounts Payable, P.O. Drawer 1300, Pompano Beach, Florida, 33061. In accordance with Florida Statutes, Chapter 218, payment will be made within 45 days after receipt of a proper invoice.

k. Public Records

1. The City of Pompano Beach is a public agency subject to Chapter 119, Florida Statutes. The Contractor shall comply with Florida's Public Records Law, as amended. Specifically, the Contractor shall:

   a. Keep and maintain public records required by the City in order to perform the service;

   b. Upon request from the City's custodian of public records, provide the City with a copy of requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes or as otherwise provided by law;

   c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the Contractor does not transfer the records to the City; and

   d. Upon completion of the contract, transfer, at no cost to the City, all public records in possession of the Contractor, or keep and maintain public records required by the City to perform the service. If the Contractor transfers all public records to the City upon completion of the contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of the contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records in a format that is compatible with the information technology systems of the City.

2. Failure of the Contractor to provide the above described public records to the City within a reasonable time may subject Contractor to penalties under 119.10, Florida Statutes, as amended.

PUBLIC RECORDS CUSTODIAN

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:

CITY CLERK
100 W. Atlantic Blvd., Suite 253
Pompano Beach, Florida 33060
(954) 786-4611
RecordsCustodian@copbfl.com

21. Questions and Communication

All questions regarding the RLI are to be submitted using the Questions feature in the eBid System. Questions must be received at least seven (7) calendar days before the scheduled solicitation opening. Oral and other interpretations or clarifications will be without legal effect. Addenda will be posted to the RLI solicitation in the eBid System, and it is the Proposer's responsibility to obtain all addenda before submitting a response to the solicitation.

22. Addenda

The issuance of a written addendum or posting of an answer in response to a question submitted using the Questions feature in the eBid System are the only official methods whereby interpretation, clarification, or additional information can be given. If any addenda are issued to this RLI solicitation the addendum will be issued via the eBid System. It shall be the responsibility of each Proposer, prior to submitting their response, to contact the City Purchasing Office at (954) 786-4098 to determine if addenda were issued and to make such addenda a part of their proposal. Addenda will be posted to the RLI solicitation in the eBid System.

COMPLETE THE PROJECT TEAM FORM ON THE ATTACHMENTS TAB IN THE EBID SYSTEM. PROPOSERS ARE TO COMPLETE FORM IN ITS ENTIRITY AND INCLUDE THE FORM IN YOUR PROPOSAL THAT MUST BE UPLOADED TO THE RESPONSE ATTACHMENTS TAB FOR THE RLI IN THE EBID SYSTEM.

PROJECT TEAM

RLI NUMBER _____

Federal I.D.#_____

PRIME

Role	Name of Individual Assigned to Project	Number of Years Experience	Education, Degrees
Principal-In-Charge			
Project Manager			
Asst. Project Manager			
Other Key Member			
Other Key Member			

SUB-CONSULTANT

Role	Company Name and Address of Office Handling This Project	Name of Individual Assigned to the Project
Surveying		
Landscaping		
Engineering		
Other Key Member		
Other Key Member		
Other Key Member		
Other Key Member		

(use attachments if necessary)

City of Pompano Beach Florida

Local Business Subcontractor Utilization Report

Project Name (1)		Contract Number and Work Order Number (if applicable) (2)	
Report Number (3)	Reporting Period (4) to	Local Business Contract Goal (5)	Estimated Contract Completion Date (6)
Contractor Name (7)		Contractor Telephone Number (8) ( ) -	Contractor Email Address (9)
Contractor Street Address (10)	Project Manager Name (11)	Project Manager Telephone Number (12) ( ) -	Project Manager Email Address (13)

Local Business Payment Report

Federal Identification Number (14)	Local Subcontractor Business Name (15)	Description of Work (16)	Project Amount (17)	Amount Paid this Reporting Period (18)	Invoice Number (19)	Total Paid to Date (20)
				Total Paid to Date for All Local Business Subcontractors (21) $		0.00

I certify that the above information is true to the best of my knowledge.

Contractor Name – Authorized Personnel (print) (22)	Contractor Name – Authorized Personnel (sign) (23)	Title (24)	Date (25)

Local Business Subcontractor Utilization Report Instructions

Box (1) **Project Name –** Enter the entire name of the project.

Box (2) **Contract Number (work order) –** Enter the contract number and the work order number, if applicable (i.e., 4600001234, and if work order contract include work order number – 4600000568 WO 01).

Box (3) **Report Number -** Enter the Local Business Subcontractor Utilization Report number. Reports must be in a numerical series (i.e., 1, 2, 3).

Box (4) **Reporting Period -** Enter the beginning and end dates this report covers (i.e., 10/01/2016 – 11/01/2016).

Box (5) **Local Contract Goal -** Enter the Local Contract Goal percentage on entire contract.

Box (6) **Contract Completion Date -** Enter the expiration date of the contract, (not work the order).

Box (7) **Contractor Name -** Enter the complete legal business name of the Prime Contractor.

Box (8) **Contractor Telephone Number -** Enter the telephone number of the Prime Contractor.

Box (9) **Contractor Email Address -** Enter the email address of the Prime Contractor.

Box (10) **Contractor Street Address –** Enter the mailing address of the Prime Contractor.

Box (11) **Project Manager Name -** Enter the name of the Project Manager for the Prime Contractor on the project.

Box (12) **Project Manager Telephone Number –** Enter the direct telephone number of the Prime Contractor's Project Manager.

Box (13) **Project Manager Email Address –** Enter the email address of the Prime Contractor's Project Manager.

Box (14) **Federal Identification Number –** Enter the federal identification number of the Local Subcontractor(s).

Box (15) **Local Subcontractor Business Name** – Enter the complete legal business name of the Local Subcontractor(s).

Box (16) **Description of Work –** Enter the type of work being performed by the Local Subcontractor(s) (i.e., electrical services).

Box (17) **Project Amount –** Enter the dollar amount allocated to the Local Subcontractor(s) for the entire project (i.e., amount in the subcontract agreement).

Box (18) **Amount Paid this Reporting Period** – Enter the total amount paid to the Local Subcontractor(s) during the reporting period.

Box (19) **Invoice Number** – Enter the Local Subcontractor's invoice number related to the payment reported this period.

Box (20) **Total Paid to Date** – Enter the total amount paid to the Local Subcontractor(s) to date.

Box (21) **Total Paid to Date for All Local Subcontractor(s)** – Enter the total dollar amount paid to date to all Local Subcontractors listed on the report.

Box (22) **Contractor Name Authorized Personnel (print)** – Print the name of the employee that is authorized to execute the Local Subcontractor Utilization Report.

Box (23) **Contractor Name Authorized Personnel (sign)** – Signature of authorized employee to execute the Local Subcontractor Utilization Report.

Box (24) **Title –** Enter the title of authorized employee completing the Local Subcontractor Utilization Report.

Box (25) **Date –** Enter the date of submission of the Local Subcontractor Utilization Report to the City.

REQUESTED INFORMATION BELOW IS ON THE LOCAL BUSINESS PROGRAM FORM ON THE BID ATTACHMENTS TAB. BIDDERS ARE TO COMPLETE FORM IN ITS ENTIRITY AND INCLUDE COMPLETED FORM IN YOUR PROPOSAL THAT MUST BE UPLOADED TO THE RESPONSE ATTACHMENTS TAB IN THE EBID SYSTEM.

EXHIBIT A
CITY OF POMPANO BEACH, FLORIDA
LOCAL BUSINESS PARTICIPATION FORM

RLI Number & Title: _____ Prime Contractor's Name: _____

Name of Firm, Address	Contact Person, Telephone Number	Type of Work to be Performed/Materials to be Purchased	Contract Percentage

EXHIBIT B
LOCAL BUSINESS
LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

RLI Number_____

TO: _____
(Name of Prime or General Bidder)

The undersigned City of Pompano Beach business intends to perform subcontracting work in connection with the above contract as (check below)

_____ an individual _____ a corporation

_____ a partnership _____ a joint venture

The undersigned is prepared to perform the following work in connection with the above Contract, as hereafter described in detail:

_____

_____

_____

_____

_____

_____

_____

_____ _____
(Date) (Name of Local Business Contractor)

_____
(address)

_____
(address City, State Zip Code)

BY: _____
(Name)

EXHIBIT C
LOCAL BUSINESS UNAVAILABILITY FORM

RLI #_____

I,_____
(Name and Title)

of_____, certify that on the _____day of

_____, _____, I invited the following LOCAL BUSINESSES to bid work
(Month) (Year)

items to be performed in the City of Pompano Beach.

Business Name, Address	Work Items Sought	Form of Bid Sought (i.e., Unit Price, Materials/Labor, Labor Only, etc.)

Said Local Businesses:

___ Did not bid in response to the invitation

___ Submitted a bid which was not the low responsible bid

___ Other:_____

Name and Title: _____

Date: _____

Note: Attach additional documents as available.

EXHIBIT D
GOOD FAITH EFFORT REPORT
LOCAL BUSINESS PARTICIPATION

RLI #_____

1. What portions of the contract have you identified as Local Business opportunities?

_____

_____

_____

_____

2. Did you provide adequate information to identified Local Businesses? Please comment on how you provided this information.

_____

_____

_____

3. Did you send written notices to Local Businesses?

____ Yes ____ No

If yes, please include copy of the notice and the list of individuals who were forwarded copies of the notices.

4. Did you advertise in local publications?

____ Yes ____ No

If yes, please attach copies of the ads, including name and dates of publication.

5. What type of efforts did you make to assist Local Businesses in contracting with you?

_____

_____

7. List the Local Businesses you will utilize and subcontract percentage of work.

_____ _____

LOCAL BUSINESS EXHIBIT “D” – Page 2

Local Business	% of Work
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8. Other comments: _____

_____

_____

_____

_____

REQUESTED INFORMATION BELOW IS ON THE MINORITY BUSINESS ENTERPRISE PARTICIPATION FORM ON THE BID ATTACHMENTS TAB. BIDDERS ARE TO COMPLETE FORM IN ITS ENTIRITY AND UPLOAD COMPLETED FORM TO THE EBID SYSTEM

EXHIBIT E

MINORITY BUSINESS ENTERPRISE PARTICIPATION

RLI #_____

List all members of your team that are a certified Minority Business Enterprise (as defined by the State of Florida.) You must include copies of the MBE certificates for each firm listed with your electronic submittal.

Name of Firm	Certificate Included?

Online Questions & Answers

Event Information

Number:	E-28-19
Title:	Raw Water Well Consulting Services
Type:	Request for Letters of Interest
Issue Date:	5/16/2019
Question Deadline:	6/24/2019 05:00 PM (ET)
Response Deadline:	7/10/2019 02:00 PM (ET)
Notes:	

Pursuant to Florida Statutes Chapter 287.055 "Consultants' Competitive Negotiation Act" the City of Pompano Beach invites professional hydrogeologic and engineering firms to submit Letters of Interest, qualifications and experience for consideration to provide design study services related to raw water wells.

The City will receive sealed proposals until **2:00 p.m. (local), July 1, 2019**. Proposals must be submitted electronically through the eBid System on or before the due date/time stated above. Any proposal received after the due date and time specified, will not be considered. Any uncertainty regarding the time a proposal is received will be resolved against the Proposer.

Proposer must be registered on the City's eBid System in order to view the solicitation documents and respond to this solicitation. The complete solicitation document can be downloaded for free from the eBid System as a pdf at: https://pompanobeachfl.ionwave.net/CurrentSourcingEvents.aspx. The City is not responsible for the accuracy or completeness of any documentation the Proposer receives from any source other than from the eBid System. Proposer is solely responsible for downloading all required documents. Responses will be electronically unsealed in a public forum and read aloud.

Published Questions

Question	The scope of work under the HYDROGEOLIGIC SERVICES paragraph (pg 2 of the RLIE-28-19), states that the “The Utilities Department plans to study the feasibility of abandoning and relocating raw water wells located in the eastern wellfield. Proposed well locations will require easement procurement for future raw water wells, the required power supply and distribution piping in the western wellfield.” The first statement and task references the eastern wellfield and the second statement and task references the western wellfield. Should the wellfield in the second statement reference the “eastern wellfield” as it related to the results of the feasibility study or is the second statement a separate task for the western wellfield only and the feasibility study (as discussed in the first statement) only applies to the eastern wellfield?
Answer	For clarification: We are proposing to abandon and relocate wells in the eastern wellfield only. This study may propose new well locations in eastern and western wellfields, thus requiring easement procurement, required power supply and distribution piping.
Asked	6/19/2019 12:52 PM (ET)

City of Pompano Beach, FL
Individual Award

Bid Information

Bid Creator	Jeff English Purchasing Agent
Email	jeffrey.english@copbfl.com
Phone	(954) 786-4098
Fax	(954) 786-4168
Bid Number	E-28-19
Title	Raw Water Well Consulting Services
Bid Type	RLI
Issue Date	5/16/2019 06:24 PM (ET)
Close Date	7/10/2019 02:00:00 PM (ET)
Alternates	

Contact Information

Contact	Jeff English
Address	1190 NE 3rd Avenue Building C Pompano Beach, FL 33060
Telephone	(954) 786-4098
Fax	(954) 786-4168
Email	purchasing@copbfl.com

Ship to Information

Contact	
Address	
Telephone	
Fax	
Email	

Supplier Information

Company	Tetra Tech
Contact	
Address	201 E Pine Street Orlando, FL 32801
Telephone	(407) 839-3955
Fax	
Email	
Submitted	7/10/2019 11:26:08 AM (ET)

Supplier Notes

Award Total : $.00

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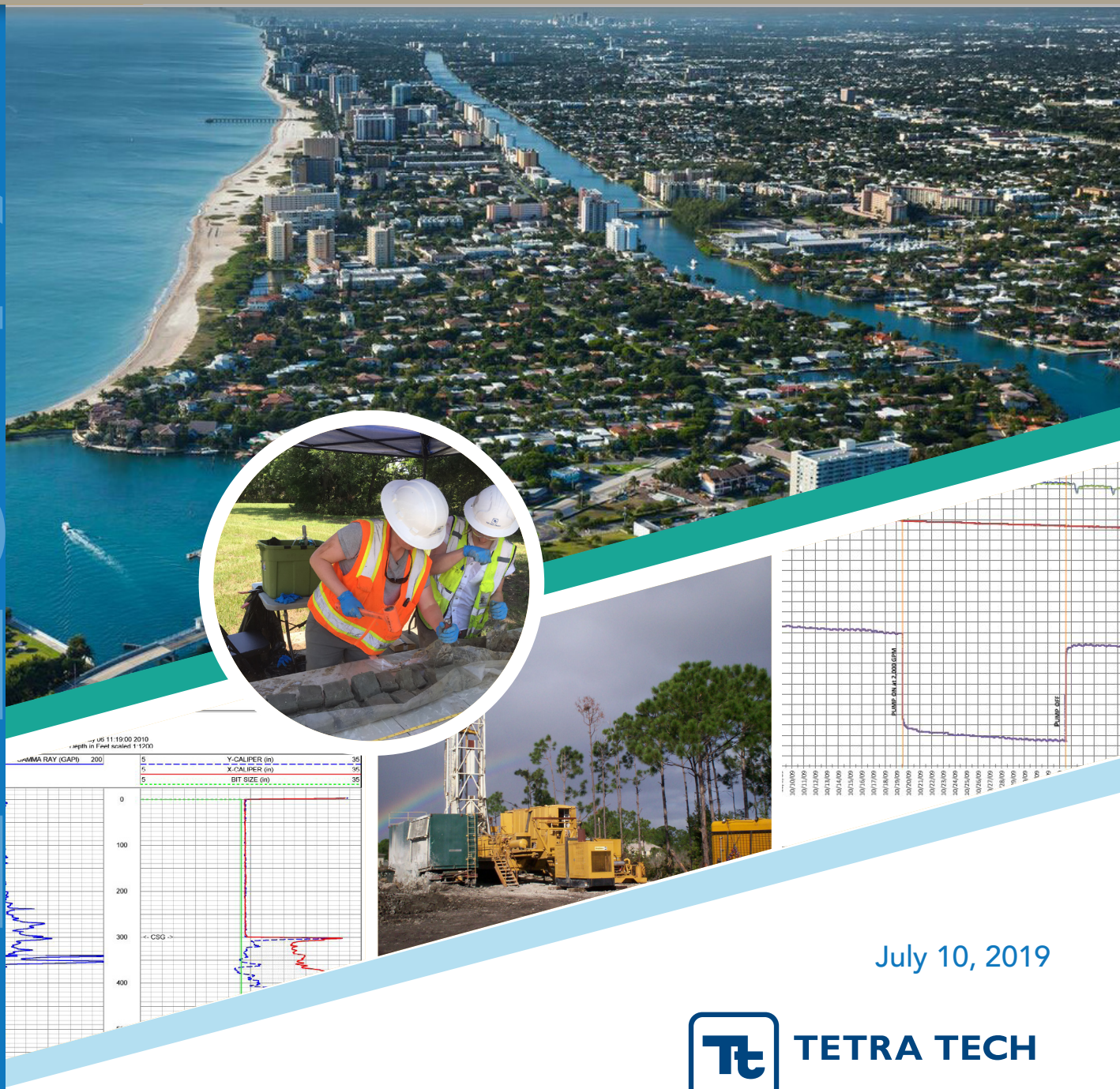
LETTERS OF INTEREST
E-28-19

RAW WATER WELL CONSULTING SERVICES



July 10, 2019

TETRA TECH

E-28-19

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REQUEST FOR LETTERS OF INTEREST

E-28-19

RAW WATER WELL CONSULTING SERVICES

Date:

July 10, 2019

Firm:

Tetra Tech, Inc.

450 N. Park Road, Suite 502

Hollywood, FL 33021

Contact:

Charles Drake, PG

Phone: 407.256.7715

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LETTER OF INTEREST

E-28-19

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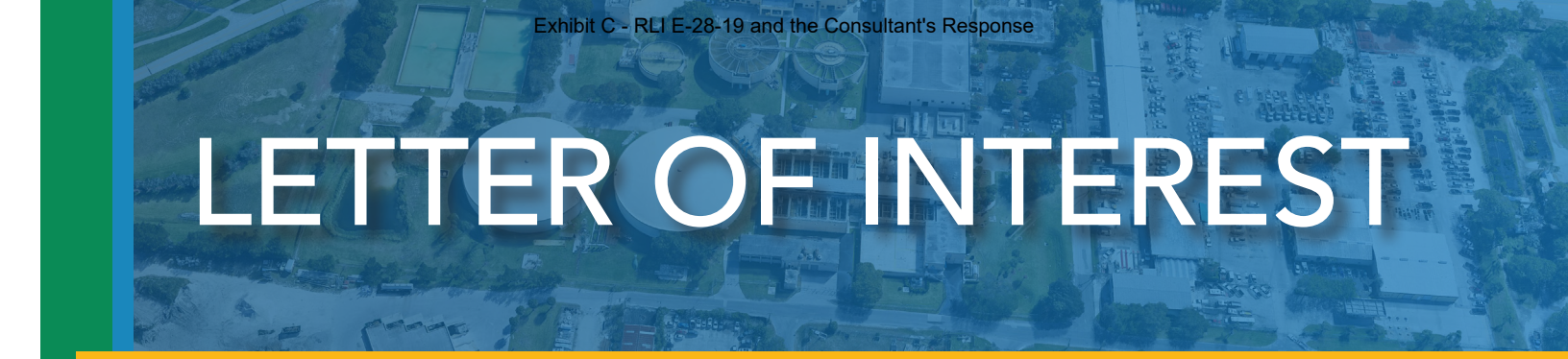


LETTER OF INTEREST

July 10, 2019

City of Pompano Beach
Purchasing Office
1190 N.E. 3rd Avenue, Building C
Pompano Beach, Florida 33060

Subject: RLI E-28-19 Raw Water Well Consulting Services Submittal

Dear Selection Committee Members:

Corporate Name: Tetra Tech, Inc.

FEIN: 95-4148514

Address: 450 N. Park Rd. Suite 502, Hollywood, FL 33021

Phone: 954.364.1752

Mobile: 407.256.7715

Fax: N/A

Contact: Charles Drake, PG
Vice President
Charles.drake@tetratech.com

Successful projects begin with the commitment of a qualified and experienced team. Tetra Tech, Inc. is a full-service hydrogeologic and engineering firm that specializes in all aspects of water supply and treatment, including design and construction management services, water use permitting and groundwater flow and transport modeling. Tetra Tech assembled a team of committed professional engineers, geologists and surveyors, and other professionals to deliver to you a successful wellfield relocation program. The expertise and success of our team members are described in our response to your RLI and demonstrated by the success of similar projects in southeast Florida.

I will serve as the Principal-in-Charge and Project Manager on this contract. I am committed to perform an active role in all aspects of this project; starting from the kick-off meeting, to making presentations to the City officials, staff and public, consulting with the SFWMD on water use permitting and well construction issues, and providing input on bid documents.

Our team, individually and as a company, have many years of experience in southeast Florida concerning water well design and construction management, water use permitting, groundwater flow and transport modeling, hydraulic modeling, wellhead facilities, and raw water line design, construction, and permitting.

Tetra Tech is a full-service, multidisciplinary firm that provides all the in-house services that the City will need for a successful project. To supplement the team's expertise and depth of experience, we included JLA Geosciences, Inc., to provide hydrogeologic sub-consulting services. They will also contribute additional southeast Florida well design and construction management experience. JLA is located in Jupiter, Florida and will offer cost-effective well construction management and field services, as well as additional local hydrogeologic conditions knowledge. We are also including local Pompano Beach companies: Keith and Associates, Inc. for surveying services and Pace Analytical Laboratories, Inc. for analyzing raw well water analyses.

We assisted many utilities with the design, permitting, and construction of new wellfields and water treatment plants from concept to putting the wellfield and water treatment plant on-line. These wellfields and water treatment facilities range in capacity from a few million gallons per day to over 30 MGD AADF, and from lime softening to reverse osmosis treatment. There are very few firms that have a similar 30-year history that the Tetra Tech Team brings to you.

We understand that the City wants to study the feasibility of relocating the eastern wellfield located on the airpark property and western wellfield in the Palm Aire area. If the project is feasible, the City will continue the project with 100% construction design documents to include bid specifications, prepare contract documents, bidding assistance, permitting assistance, and construction management services. We will also provide SRF expertise if needed. We include a detailed technical approach for these services in our submittal.

Our project team includes hydrogeologists to conduct the necessary investigations, groundwater flow and transport modeling/ hydrogeologic and well design and construction management. We also added engineers to perform hydraulic modeling from the new wells to the water treatment plant, design new raw water lines, design pumps/ motors and controls and evaluate raw water quality from the new wells to determine compatibility with your existing treatment processes.

Furthermore, the key team members have worked together for more than 20 years; and in the case of Mr. Christopher, Mr. Drake, and Mr. Dufresne for 30 years on many similar projects.

Tetra Tech is one of the largest engineering design firms in the nation and rank Number 1 in Water by ENR for 16 years in a row. We are a leader in the environmental engineering industry, providing engineering and hydrogeological services from 25 offices in Florida. Our Hollywood office will allow you to benefit from our local professionals and staff with nationally recognized resources.

Tetra Tech will serve the City from our Hollywood office, and I will be the main contact regarding this submission.
My contact information is:

Charles W. Drake, PG, CPG, Vice-President
Email: Charles.drake@tetratech.com
Phone: (407) 256 - 7715 (mobile)

The Tetra Tech Team is dedicated providing the City of Pompano Beach a successful project so that the City can continue to supply high-quality drinking water to its' customers at an affordable price. Tetra Tech also acknowledges receiving and reviewing Addendum No. 1. We look forward to working with you on your wellfield relocation project.

Sincerely,

Tetra Tech

Charles W. Drake, PG, CPG
Vice President

pompano beach℠
Florida's Warmest Welcome

TECHNICAL APPROACH

E-28-19

TETRA TECH

TECHNICAL APPROACH

WORK PLAN

Our technical approach describes, in a general manner, how Tetra Tech will accomplish each of the tasks / deliverables identified in the RLI. We also provide a few specifics on some of our knowledge of the wellfield issues. After each task description, we've identified the deliverable associated with that task.

There are a few key items that we believe are important to the project; such as utilizing City-controlled or owned property or easements as much as possible to reduce or eliminate land acquisition costs, use of submersible pumps in the new wells and equip the new wells with variable frequency drives (VFDs) to be able to control the well yield as needed to meet demands, potentially constructing 24" diameter wells, using CertainTeed Certa-Lok or similar well casing materials, evaluating the potential for salt water intrusion or upconing, and meeting all SFWMD water use permitting requirements.

Our work will be performed keeping in mind that the end product is to have high quality raw water wells installed in a safe secure environment which will produce high quality water and reduce well maintenance and maintain a high well efficiency over time.

TASK A. FEASIBILITY STUDY

This section is organized like the Feasibility Study, with a description in each section of the work that we will conduct. We will begin our feasibility study by meeting with the City to learn more about the specific goals and objectives for the project.

During the initial meeting, we will discuss with you your thoughts on the general location of where you think City-owned property or easements exist close to the existing wells and raw water lines, and any constraints to well construction that you're aware of. Additionally, we will get your preferences for well casing materials, pump houses, upgrades to control systems, VFDs, etc.

Section 1. Project Background and Understanding

We understand that the City would like to decommission and abandon the Eastern wellfields wells that are on the Pompano Beach Airpark property and, depending upon the results of the evaluation of the existing wells, decommission and abandon wells off Airpark property. There are 16 wells in the Eastern wells that were constructed during the 1950s, '60s, '70s and one well in 1984. It's likely that the well casings over 40 years old are near or at the end of their useful life.

The Western wellfield was constructed in the early- to mid-1980s, and some of the wells are now pumping sand. One part of the evaluation of the existing wells will be to put a Rossum sand tester on each well (Eastern and Western wellfields) to determine if and how much sand is being produced from each well. The amount of sand being produced is clogging the pre-filters and causing the City to replace them two to three times faster than normal. The cost around $10,000 per filter so it is important to rehabilitate or replace those wells as soon as possible.

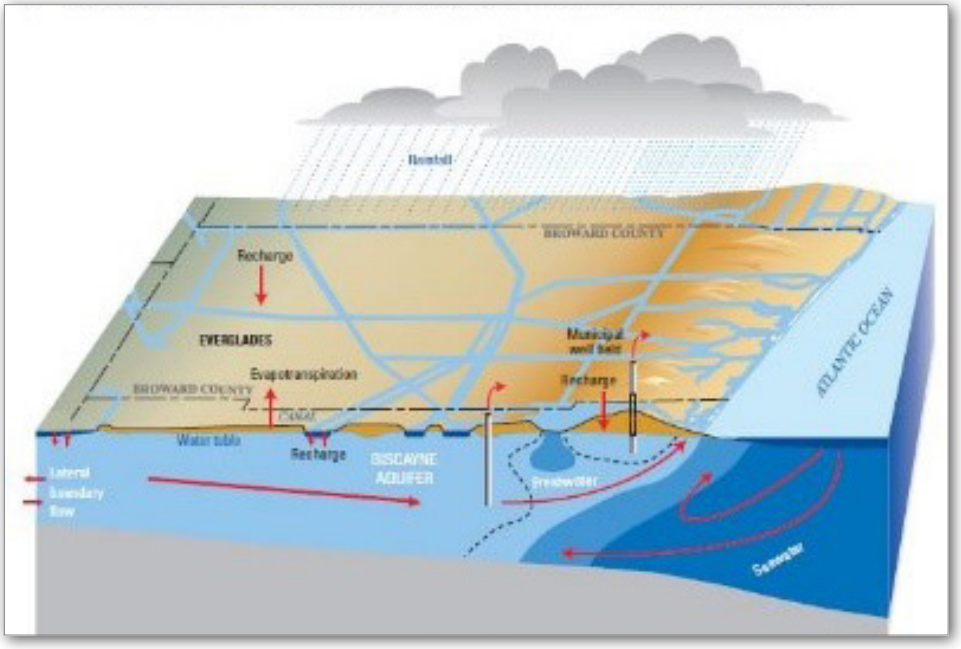
Section 2. Well Site Selection Criteria

We will schedule a project kick-off meeting with you to review the overall project and define the well site selection criteria. By establishing the site selection criteria, everyone involved can easily understand how the sites were selected or rejected. This will be especially useful in making presentations to elected officials, staff and the public.

Our thought is, in general, the new wells should be:
1) As close as possible to existing raw water lines to reduce the capital cost of constructing new raw water lines and reduce pumping costs to the water treatment plant; 2) Maintain a well spacing similar to the current well spacing to minimize impacts on adjacent wells due to pumping, and 3) Distance to power, and 4) Ease of access.

Constraints include, are not limited to, property ownership, sanitary sewer hazards, railroad tracks, canals, wetlands, salt water intrusion lines, buried power and other utilities,

TECHNICAL APPROACH

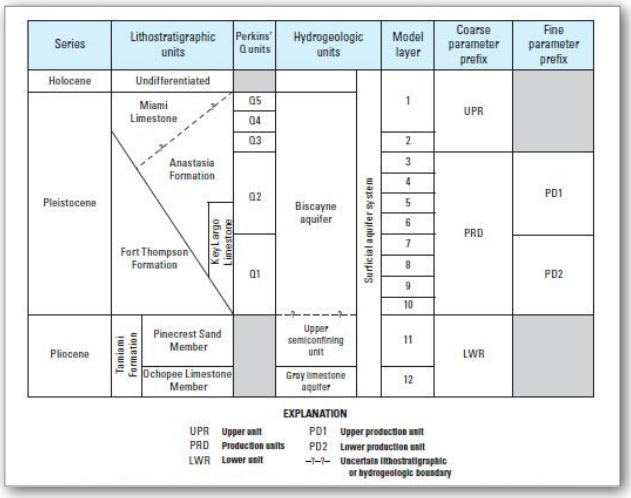


Conceptual model of groundwater flow and salt water intrusion in the Biscayne aquifer, Broward County.

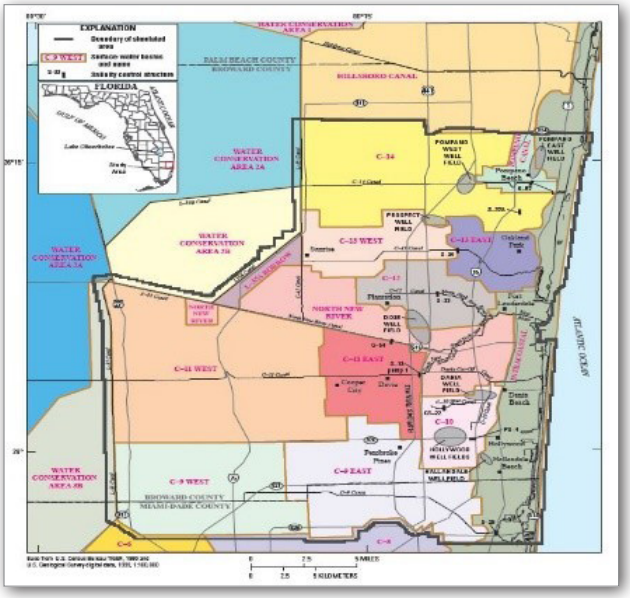
overhead power lines (must not place a drill rig under or near high voltage power lines).

We will conduct a survey to identify and locate the facilities that the installations that could pose a sanitary hazard to public supply wells, as listed in Table 1 in Chapter 62-534. Using City and state data, we will identify those facilities.

Additional constraints will be identified by performing a Phase I Environmental Site Assessment (Phase I). A Phase I ESA searches numerous data bases that encompass RCRA, CERCLA hazardous waste sites, FDEP data bases for reported contamination, historical conditions through aerial



Hydrostratigraphic and model layer correlation chart for the surficial aquifer system in Broward County (Fish, 1988; Perkins, 1977; Reese and Cunningham, 2000).

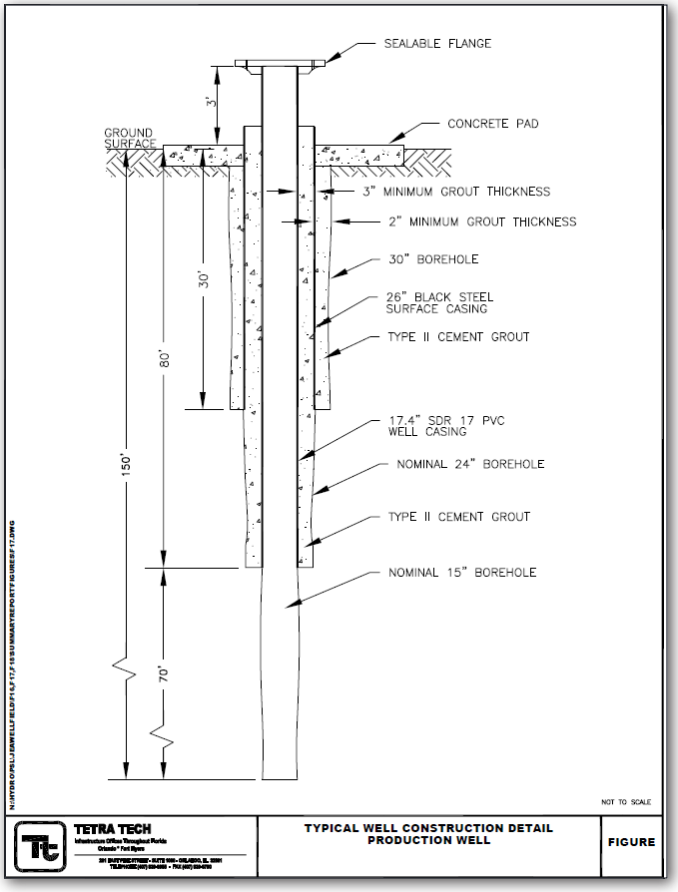


The study area in southeastern Florida.

photography and for recognized environmental conditions. We will include National Wetland Inventory mapping and FEMA flood plain analyses in our site selection process.

Once the well sites are selected, we will construct a conceptual groundwater flow model to evaluate potential adverse impacts at the proposed pumping rates, by simulating the proposed wells under the current wellfield schedule and/ or protocol.

Our GIS analysts will conduct a spatial analysis of these constraints and will draw a set-back distance for each



constraint. We will also prepare a series of overlays so that the resulting map will identify suitable well sites. Once that has been accomplished, we will go to each site for a visual inspection. The GIS map will also allow for constructability issues to be identified and addressed in the feasibility study.

The base model we will use for estimating adverse impacts will be either SFWMDs LECSR (Lower East Coast Sub-Regional) model or the USGS groundwater flow and transport model (Scientific Investigation Report 2016-5022). We will evaluate the ease of use and ability to modify cell size and perhaps boundary conditions before we know which will be better for your application. The LECSR has been used by SFWMD for water use permitting, so it may be the better choice, as it's been developed and accepted by the SFWMD.

The USGS model is a multi-layered model that allows for a salt water upconing/ intrusion analysis. We will also develop a simple Excel-based spreadsheet to run a Schmorak-Mercado upconing analysis. The SFWMD has accepted the Schmorak-Mercado model analysis for other WUPs that we have obtained.

Because this would not be a calibrated model, it would have to be calibrated prior to making final site selections and wellfield design. Even uncalibrated, it would be suitable for use in meeting with SFWMD to discuss the well relocation program, and any concerns they may have with the model we've selected.

Section 3. Conceptual Well Design

Assuming the total depth and casing depth of the new wells will be approximately the same as the existing wells, we will focus on the casing materials, pumps and controls, and well diameter. Final depth are established in the field. The City may want to consider constructing the new wells with nominal 24" diameter casing to be able to install a larger pump and increase well yield, as long as the increased well yield doesn't cause an adverse environmental impact. We will estimate the cost differential between a 16" and 24" well versus the increased capacity of the well and raw waterline costs. The groundwater flow and transport model described above can also be used to make that assessment; i.e. fewer wells with a higher individual well yield may produce no adverse environmental impacts than more wells at a lower yield spaced out further from other wells and reduce construction costs.

Existing specific capacity and well loss data will be used to help with the 16" v. 24" diameter well determination. If no specific capacity test data is available, we suggest estimating the specific capacity from two to three wells in each wellfield by pumping the well at a known rate and measuring drawdown. This will quickly give us data that can be used to estimate well yield and drawdown. If additional testing is needed, we will conduct a more intensive step-drawdown test to estimate the most efficient well yield. During a step-drawdown test, the well is pumped at four escalating rates and water level measured and gallons/ minute/ foot of drawdown calculated. That data is also used to calculate the well loss coefficient (head loss due to friction in the well casing) and aquifer loss (drawdown due to friction of water flowing through the aquifer). The well loss and aquifer loss are used to determine the efficiency of the well and, also the most efficient pumping rate.

The table on page 7 is an example of a step-drawdown test we ran on an upper Floridan aquifer well, and is presented for illustrative purposes. It shows the results of the testing and decreasing well efficiency at higher pump rates. Increasing the well yield by 270 gpm produces an additional 36 feet of drawdown out a total 127 feet of drawdown. It may be cost-effective to design the well pump and motor to gain the additional 270 gpm, as long as no adverse impacts, such as saltwater upconing would occur, or excessive impacts on canals, which was a consideration of your 2005 WUP.

We have been successful with the use of CertainTeed PVC well casing, and it is manufactured up to a nominal 16" pipe size. It is not made in a nominal 24" pipe size, so we'd have to consider use of FRP for that size. We will estimate, from existing data, the depth to water and pump setting depth. The groundwater flow model can also be used, along with the specific capacity data, the depth to water under various seasonal and pumping conditions.

TPW-1 STEP DRAWDOWN TEST RESULTS

STEP	Q (gpm)	INCREMENTAL OBSERVED DRAWDOWN (Feet)	TOTAL OBSERVED DRAWDOWN (Feet)	SPECIFIC CAPACITY (gpm/ft)	s/Q (ft/gpm)	AQUIFER AND LINEAR WELL LOSSES (Feet)	WELL EFFICIENCY (%)	ESTIMATED AQUIFER DRAWDOWN (Feet)
1	649	85.80	85.80	7.6	0.1322	74.68	87.03	85.67
2	751	15.20	101.00	7.4	0.1345	86.41	85.56	101.13
3	851	15.50	116.50	7.3	0.1369	97.92	84.05	116.82
4	915	10.80	127.30	7.2	0.1391	105.28	82.70	127.14

$s = BQ + CQ^2$ B*Q $BQ + CQ^2$

B = 0.115063122
C = 2.61023E-05

This will allow us to correctly set the pump depth for each well, to ensure proper submergence of the submersible pumps. Ideally, the water level above the pump under pumping conditions and with seasonal fluctuations, should be at least 10 feet.

After completion of this task, the total number of wells needed to meet water demands can be determined. The identification of suitable well sites can begin soon after meeting with you and establishing the site selection criteria and site constraints. We assume that the City would like to have a well house constructed around the wellhead and appurtenances for aesthetic and security reasons, so we will provide a conceptual well house design.

Section 4. Regulatory Considerations

While permitting requirements and assistance, and evaluating your consumptive use permit, it is appropriate to also discuss the relocation project with the SFWMD to understand, as soon as possible, any permitting issues or constraints that would affect the site selection process.

We will schedule a meeting with the SFWMD water use permitting staff to discuss the project and get their thoughts and potential requirements for permitting a new wellfield. We have worked with SFWMD on many water-uses permits and permitting issues. One issue to discuss is the preferred groundwater flow model. We can use either the LECSR groundwater flow model or USGS model for permitting of the new wells. We will identify the model and model code that would be needed to permit the new wells and make an application to modify your existing water use permit.

We will meet with the FDEP in a similar manner to identify any issues they may have and include them in the final site selection.

Section 5. Conceptual Cost Estimate

We will provide an opinion of probable cost to construct and outfit the wells, and roughly the cost to install new raw water lines. We will provide a complete cost estimate after we have met with you to discuss the feasibility study results and firmly identify the proposed well locations.

At the City's discretion, we can provide a draft feasibility report, or provide interim technical memoranda to describe the work and results of the work as it is being done. In that way, you are up to speed throughout the feasibility study and can make comments or corrections as needed along the way.

Interim Task- Meeting with City

Upon completion of the Feasibility Study and review by the City staff, we will meet with you to discuss going forward with making final site selections such that we can produce the proposed site locations.

During this meeting, we will discuss the advantages and disadvantages of each site with respect to the selection criteria and regulatory considerations. When we have done that, we will be able to begin the process of laying out the new well locations, new raw water lines, connection to power, wellhead facilities, wellhouse design, wellhouse design, and other considerations in order to provide you a construction cost estimate.

Task A. Deliverable - Feasibility Report

TASK B. PRODUCE PROPOSED SITE LOCATIONS

This deliverable will produce essentially a 30% design drawing set showing the location and property where the well sites are located, dimensions of the raw water lines, electrical controls at each well, and associated equipment and/ or access roads, if needed.

The 30% design will include hydraulic modeling of the proposed wells to correctly size the raw water lines and establish TDH for each well so that the submersible pumps and controls can be selected. The 30% design will allow us to provide an accurate cost estimate for the project and will be submitted to and reviewed by the City for comments.

The wellhead facilities, including pump, motor and controls will preliminarily selected during this phase.

Task B. Deliverable - Proposed Well Location Technical Memorandum

TASK C. PROVIDE 100% DESIGN DOCUMENTS FOR PROPOSED WELLS

The 100% design documents will be prepared and submitted to the City for review, and after the City's comments have been addressed we will upload them to the City's website. We will prepare construction drawings necessary to clearly depict the improvements identified during preliminary design. A preliminary list of drawings is presented below:

General
Cover Sheet, Drawing Index, Location Map and General Notes, Legend and Abbreviations.

Civil
Existing Conditions, Proposed Overall Wellfield Site Plan, Sitework Plan

Site Geometry Plan, Site Paving, Drainage and Grading Plan, Well Locations and Site Plans, Civil Details

Architectural
General Notes and Site Plan, Wellhouse

Process Mechanical
Mechanical Site Plan, Major Yard Piping Plan, Yard Piping Details

Raw Water Production Wells
Raw Water Production Well Typical Plan and Section
Raw Water Production Well Details, Pumps/ Motors

Electrical
Electrical Abbreviations and Symbols, Switchgear Single Line Diagram, MCC #'s, elementary Control Diagrams, Instrumentation and Controls - Conduit and Wire Riser, Panel Schedules, Wellhouse Lighting Fixture, Electrical Details, Electrical Site Plan, Raw Water Production Well Typical

Instrumentation

Abbreviations

Raw Supply Wells P&ID

Task C. Deliverable - 100% Design Documents

TASK D. EVALUATE EXISTING WELL CONDITIONS AND PROVIDE REHABILITATION RECOMMENDATIONS

This task can be conducted concurrently with the preceding tasks but should be completed prior to providing the 100% design documents. In this way, we may be able to bundle well rehab services with well construction services and get a better price from the water well contractors.

To evaluate the existing well conditions, we will need to review the original well construction information and design, historical well testing and maintenance records, and other historical data. We will test each well for sand concentration, sample the water for bacteriological activity using a BARTS or similar test kit, and depending on those results and the historical specific capacity test data, we will make recommendations on further testing. Further testing would include conducting a step-drawdown test to determine specific capacity and well efficiency, and if the well is in the 70%-80% efficiency range, and no sand is being produced and there is no biological activity is found, then it is likely that no rehabilitation would be needed.

However, if the efficiency is low, or sand is produced above the AWWA recommended maximum (5 mg/L), or there is biological activity, the well should be rehabbed.

The first step in rehabbing a well is to remove the pump and motor and run a borehole televiewer to see the condition of the casing, and if it has significant rust scaling, or biofouling. A temporary pump can be installed in the well with the borehole televiewer downhole, and then pump the well to determine if sand is being produced and from where.

That information can be used to design a rehab program for the well or determine that the well can't be rehabbed or it would be cost prohibitive to do so.

Rehab of the wells may include acidization, mechanical scrubbing of the well casing, over-pumping to develop the well after acidization and scrubbing, followed by disinfection of the permanent pump and column pipe. The well will be tested for bacteria in accordance with FDEP regulations, and once cleared, we will apply to the FDEP to put the well back in service. The water quality data and bacteriological test data will be used to support the application.

If the well is pumping sand, the borehole televiewer may show from where the sand is produced. Using that information, we can determine whether it's better to, for example, pressure grout the casing to seal off the interval producing sand, or to construct a new well. If the casing is severely corroded, slip-lining the casing may be possible, but the well yield would be reduced because the casing diameter would be smaller likely resulting in the need to have a smaller pump. The age of the well will also be taken into account.

Each well can be tested in this manner, so that at the end of this task, the City will know how many wells can be rehabbed and how many can continue to be used.

Task D. Deliverables - Well Testing and Evaluation Report and Recommendations; Well Rehabilitation Report

TASK E. PROVIDE ALL PERMITTING REQUIREMENTS/ ASSISTANCE WITH ALL REGULATORY AGENCIES

Upon successful completion of the new wells, and rehabilitation of existing wells, submit an application to the FDEP to put the wells on-line. The application will consist of the primary and secondary drinking water standards analysis, bacteriological test results and compliance with existing water treatment methods.

Task E. Deliverable - Submit application to the FDEP

TASK F. EVALUATE CONSUMPTIVE USE PERMITTING

The City holds water use permit 06-00070-W, first issued September 14, 2005. It has been modified twice since then and maintains the original expiration date of September 14, 2025. The WUP was most recently modified in 2015 to revise Limiting Condition 25 to acknowledge that the City operates a reuse distribution system, not a wastewater treatment plant. The current allocation is 6,478 million gallons (MG) per year with a maximum month allocation of 610 MG. Out of the total allocation the Airport (eastern) wellfield has a maximum monthly allocation of 186 MG from November 1 through May 31, and 279 MG from June 1 through October 31, of each year.

The original groundwater flow model used to demonstrate no adverse impacts and to obtain the WUP in 2005, is outdated. Tetra Tech will try and obtain that model to determine the model cell size that was used. In most cases, a new groundwater flow model isn't required if the new wells are located in the same model cell as in the original model. This is because of the finite difference model construction; withdrawals in the cell are calculated as being withdrawn from the entire cell, not an individual well. Therefore, from the modeling perspective, the location of the well within the cell doesn't affect the calculated drawdown and getting a permit.

We propose that we meet with the SFWMD to discuss permitting requirements so that during the feasibility study we can incorporate the SFWMDs requirements and use the feasibility study as part of the supporting documentation to relocate the wells.

If the feasibility study shows that the new wells should be located in other model cells, or the SFWMD requires withdrawal simulations using the updated LECSR model, we will conduct the groundwater flow modeling necessary to support the request to relocate the wells.

The LECSR is a Modflow based code, and Tetra Tech has used Modflow in all of its versions since it was first introduced in 1988. Tetra Tech and JLA Geosciences have used the Modflow code to construct numerical groundwater flow models in SE Florida for many municipal and private clients to design wellfields and/or obtain water use permits for existing wellfields. Our project team also includes the primary developer of the LECSR.

As mentioned in the description of work in the feasibility study, one of the constraints to locating new wells is avoiding the saltwater/freshwater interface. By relocating the new wells further from this interface, the likelihood of saltwater intrusion is reduced. If the SFWMD wants additional documentation, Tetra Tech will use a density dependent transport model, in addition to Modflow, to demonstrate that no additional saltwater intrusion will occur due to the new wells.

Another issue to address is the potential impacts on canals. The groundwater flow model will need to be set-up to simulate flow that could be caused to come from the canals.

We will prepare all necessary applications and supporting technical documentation to obtain, at a minimum, a letter modification, to your WUP. A letter modification is an administrative process that allows for the modification of an existing permit to account for minor changes that do not result in significant change to the terms and conditions of the permit. The SFWMD may determine that the new wells are sufficiently close to the existing well locations that no adverse impact could reasonably be expected. If this is the case, a letter modification could be obtained.

One issue for the City to consider is that if the SFWMD requires a full modification, the City may want to consider modifying the permit to ask for a new 20 or 30-year WUP. Our project schedule estimates concluding the well relocation in 2023. The City's WUP expires in September 2025, so it may be cost-effective to modify the WUP to relocate the wells, and extend the permit duration to 2055. If demand projections through 2055 demonstrate an additional allocation is needed, then we will request the additional annual and maximum month allocation.

Task F. Deliverable - Technical Memorandum on Water Use Permitting Requirements

TASK G. PERFORM BIDDING ASSISTANCE AND CONSTRUCTION RELATED SERVICES

Our bidding assistance and construction related services include:

a. Contractor pre-qualification assistance
b. Bid review
c. Shop drawing review and RFI response
d. Conduct construction coordination meetings
e. Construction contract administration
f. Construction observation

Port St. Lucie Well Construction

g. Record drawing preparation
h. Completion certification to Owner
i. Permit completion certification to Agencies
j. Project Close-out

We will work with the City to prepare the bid documents, incorporating our 100% design documents. Working with the City, we will help pre-qualify contractors for the work described, conduct bid reviews and assist with bid award recommendations, if needed.

If requested by the City, we will prepare a presentation to the City council for this project award and be prepared to respond to technical and/ or administrative questions asked by the City.

We will work with the City to schedule the project kick-off meeting with the contractor, once the contractor is retained by the City.

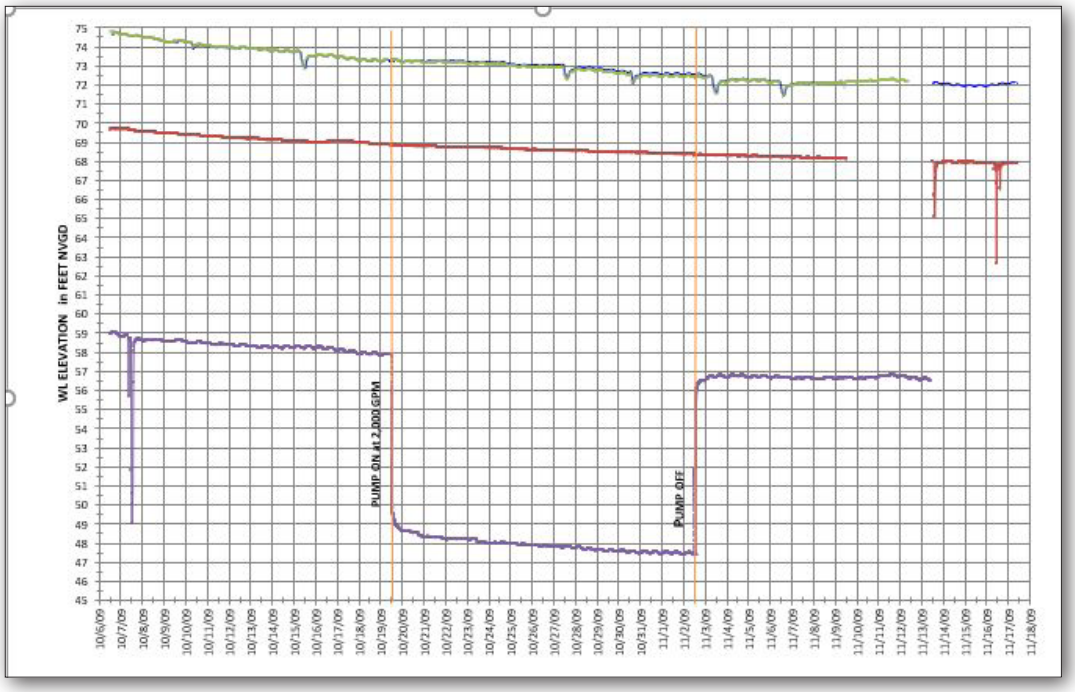
During construction and testing of the new wells, testing and rehabilitation of existing wells, construction of new raw water lines, Tetra Tech will have qualified hydrogeologists and engineers in the field to observe and inspect construction, maintain daily construction and testing logs, and confirm compliance with construction and design documents.

The production well construction and testing activities will include conducting step-drawdown tests to determine the specific capacity of the individual well. That data is then used to select the most efficient pumping rate and establish the drawdown at the pump rate. The drawdown data, converted to pumping water level elevation, will be used by the engineers to design the pump and motor, and electrical and instrumentation for that well.

The sizing of the raw water lines from the wellhead to the water treatment plant will have been described in the conceptual design report. The final pipe sizes will be selected based upon the final design pump rate of each well.

We will also run constant rate discharge test at the maximum design rate until water quality has stabilized, indicating that background water quality has been established. The raw water quality will be given to the treatment engineers to ensure compatibility with your existing treatment methods.

Upon final well completion, the permanent pump and motor and column pipe will be disinfected and installed in the well. It will be pumped at the design rate until the bacteriological samples meet



13 Day Constant Rate Discharge Test Data

the FDEP requirements. The primary and secondary drinking water data and bacteriological data will be submitted to the FDEP for well clearance to put it on line.

The daily logs will become part of the project completion report that we will prepare as part of the record drawings. The well construction and testing report is an important document for the City to have when monitoring well performance over time. The well construction and testing report can also be submitted to the SFWMD to support the WUP modification.

Task G. Deliverables - All Associated Reports and Memoranda on Well Construction, and Project Close-out Documents

TASK H. PROVIDE SIGNED/SEALED SURVEYS FOR ALL PROPOSED WELL LOCATIONS

We will use Keith and Associates to cost-effectively survey the proposed well locations, first to ensure that they are correctly located prior to start of well construction and then to survey the final well location and wellhouse, if constructed.

The survey will also include easement related surveys, raw water line routing, or other related issues. Tetra Tech's in-house licensed surveyor will provide QA/QC on all survey work.

Task H. Deliverable - Signed and Sealed Survey Documents

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SCHEDULE

E-28-19

TETRA TECH

SCHEDULE

Tasks	2019	2020				2021				2022			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
A. Perform/Provide Feasibility Study													
B. Produce Proposed Site Locations (East and West Wellfields)													
C. Provide 100% Design Documents for Proposed Wells and Associated Appurtenances													
D. Evaluate Existing Well Conditions and Provide Rehabilitation Recommendations													
E. Provide All Permitting Requirements/Assistance with All Regulatory Agencies													
F. Evaluate/Obtain Consumptive Use Permit													
G. Perform Bidding Assistance and Construction Related Services													
H. Provide Signed/Sealed Surveys for all Proposed Well Locations													

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PROJECT TEAM

E-28-19

TETRA TECH

PROJECT TEAM

RLI NUMBER L-40-15
Federal I.D.# 95-4148514

PRIME

Role	Name of Individual Assigned Project	Number of Years Experience	Education, Degrees
Principal-In-Charge, Project Manager/ Permitting	Charles Drake	36	BS, Geology
Asst. Project Manager	Ken Caban	23	MS, Environmental Engineering BS, Civil Engineering
QA/QC	John Toomey	40	BSE, Environmental Engineering
QA/QC	Pete Andersen, PE	39	MS, Civil Engineering & BCE, Civil Engineering
Hydrogeologic Investigations	Douglas Dufresne, PG	30	MS, Geology & BS, Geology
Water Treatment	James Christopher, PE	39	MS, Environmental Engineering & BS, Chemistry
Groundwater Flow/ Transport Model	W. Bruce Lafrenz, PG	33	MS, Geology & BS, Geology
SRF Assistance	Danny Nelson, PE	23	BS, Civil Engineering
Survey	Lawrence Jenkins, PSM	35	
GIS	Alex Montalvo, GISP	23	AA, General Studies
Geotechnical	Dan Zrallack, PE	22	BS, Civil Engineering
Civil Engineering	Roderick Cashe, PE	32	BS, Civil Engineering
Electrical and Instrumentation	Banks Wason, PE	13	BS, Electrical Engineering
Structural	Michael Yost, PE	44	MS, Civil Engineering & BS, Civil Engineering
Hydraulic Modeling	Justin Voss, PE	14	MSE, Civil Engineering & BSE, Civil Engineering
Field Services/ Inspection WF Con	Janine Alexander, PE	22	BS, Environmental Engineering
Wellhead Facilities	Scott Smith, PE	20	MS, Environmental Engineering & BS, Civil/Environmental Engineering

(Refer to page 20 in the RLI)

RLI NUMBER L-40-15
Federal I.D.# 95-4148514

SUB-CONSULTANT			
Role	**Company Name and Address of Office Handling This Project**	**Name of Individual Assigned to the Project**	
Other Key Member	**Keith & Associates**	**Michael Mossey**	
Surveying	**301 East Atlantic Boulevard, Pompano Beach, FL 33060**		
Landscaping	NA		
Engineering	NA		
Other Key Member	**Pace Analytical Services, Inc.**	**Rossy Guima**	
Lab Work	**3610 Park Central Blvd North Pompano Beach, FL 33064**		
Other Key Member	**JLA Geosciences, Inc.**	**James L. Andersen, PG**	**Paul Stout, PhD**
Groundwater Flow/ Transport Modeling, Field Services/ Inspection Wellfield Construction Mgmt.	**1907 Commerce Ln Suite 104 Jupiter, FL 33458**	**Laura Kuebler** **John Friedrichs, PG**	**Caroline Smith**

(Refer to page 20 in the RLI)

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ORGANIZATIONAL CHART

E-28-19

TETRA TECH

ORGANIZATIONAL CHART

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Principal-in-Charge / Project Manager
Charles Drake, PG

QA/QC
John Toomey, PE
Peter Andersen, PE
James L. Andersen, PG

Assistant Project Manager
Kenneth Caban, PE

Other Support Disciplines

Hydrogeologic Investigations
Douglas Dufresne, PG

Water Treatment
James Christopher, PE
Jennifer Roque Ribotti, PE

Groundwater Flow/Transport Modeling
W. Bruce Lafrenz, PG
Paul Stout, PhD
Laura Kuebler

SRF Assistance
Danny Nelson, PE

Survey/GIS
Lawrence Jenkins, PSM
Michael Mossey
Alex Montalvo, GISP

Geotechnical
Dan Zrallack, PE
Ardaman & Associates, Inc.
(a Tetra Tech Company)

SFWMD & FDEP Permitting
Charles Drake, PG
Diana Santander, PE
Brook Wood

Civil Engineering
Roderick Cashe, PE
Chris Zavatsky, PE

Electrical and Instrumentation
Banks Wason, PE
Amal Yelkar, EI

Structural
Michael Yost, PE
Joshi Nishant

Hydraulic Modeling
Justin Voss, PE
Kevin Roe, PE

Field Services/Inspection Wellfield Construction Mgmt.
Janine Alexander, PE
Jon Friedrichs, PG
Caroline Smith

Wellhead Facilities
Scott Smith, PE
Kevin Friedman, PE

Laboratory
Rossy Guima

Subconsultants
Keith & Associates (MBE, SBE, LB)
Pace Analytical Services, Inc. (LB)
JLA Geosciences, Inc.

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STATEMENT OF SKILLS AND EXPERIENCE OF PROJECT TEAM

E-28-19

TETRA TECH

STATEMENT OF SKILLS AND EXPERIENCE OF PROJECT TEAM

The key Pompano Beach Raw Water Consulting Services team members have worked together for over 20 years on multiple projects similar to the project proposed by the City. Additionally, Mr. Drake, Mr. Christopher, Mr. Dufresne and Mr. Lafrenz have worked together for 30 years. Our team's combined experience working together and literally side-by-side, is virtually unmatched. In the last 5 years, we have worked on the following similar projects: City of North Miami Beach, City of Port St. Lucie, Miami-Dade WASD, City of Palm Bay, Toho Water Authority, Florida Power and Light (FPL), and other smaller projects. Our subconsultants, JLA Geosciences have the cities of Jupiter, West Palm Beach, Palm Beach County and FPL. Each project included the siting of a new wellfield, exploratory well program, aquifer testing, well/ wellfield design, groundwater flow modeling, water quality testing, geophysical logging, wellfield construction, wellhead facilities, hydraulic modeling, raw water line design and construction, SFWMD water use permitting (SJRWMD for Palm Bay), FDEP permitting to put the facilities on-line, and all other services.

Our statement of skills is best expressed by having performed successfully for the client's projects described above and in many instances, continue to work for them, years later. We put these new-from-the-ground-up facilities on-line in sometimes record time, and on-budget. The WTP and wellfield capacities range from a few MGD to over 30 MGD, and wellfields with 10-17 wells each. It is our familiarity with each other and ability to work with our clients (the clients listed above have been clients for many years) and deliver successful projects to them.

Tetra Tech brings to you a team that has many years of working together on a wide range of hydrogeologic and engineering projects, and because of that relationship, can execute your project with ease. Mr. Christopher and Mr. Drake are in side-by-side offices, and other team members are a few doors away, making it very easy to get a question answered quickly.

Our sub-consultants JLA Geosciences, Inc., Keith and Associates and Pace Analytical, will report to the key team member responsible for that activity. We show several people in each category, with the Tetra Tech hydrogeologist or engineer being the lead person, and the subconsultants reporting to the lead.

We have included three QA/QC experts who will review the work being conducted in their respective fields. Mr. Toomey will be responsible for reviewing well siting criteria, raw water quality data, compatibility with your existing treatment methods, wellhead facilities, raw water line design, and overall project completion. Mr. Peter Andersen will review all groundwater flow and transport modeling. Mr. James Andersen will review all well design and testing and construction aspects of the project. They will report to Mr. Drake when they review work products.

Mr. Drake has 36 years of experience in groundwater resource testing and evaluation for all aspects of water supply and aquifer recharge projects for public utilities. This experience includes aquifer performance test and analysis, design, permitting and construction management of fresh and brackish groundwater wellfields, deep injection wells for RO concentrate, and aquifer recharge in many different hydrogeologic conditions. His regulatory experience includes working with each of the five water management districts in Florida, and the Florida Department of Environmental Protection on issues ranging from underground injection control to the hydrology of wetlands to groundwater contamination. He was the lead hydrogeologist for the cities of Palm Bay, Port St. Lucie and North Miami Beach (hydrogeologic investigations include the Biscayne and Floridan aquifer system) when they decided to construct new wellfields in an aquifer system different than their historical source. After completing the initial hydrogeologic investigation and permitting, further hydrogeologic work for Palm Bay and Port St. Lucie was turned over to Mr. Dufresne, who has continued that work through the present. Mr. Drake has located, designed and permitted and tested new wells and wellfields for the cities of Lakeland, Edgewater and New Symrna Beach.

Mr. Caban has over two decades of experience in all facets of water supply, treatment, and transmission, including groundwater modeling, water use

permitting, water supply well evaluations and rehabilitation. He has also been involved in water supply well development programs and water supply well and deep injection well construction oversight. He also has extensive experience with water supply planning, including alternative water supply planning. Mr. Caban's experience also encompasses both fresh and brackish groundwater wellfields and aquifer recharge in Southeast Florida. His water supply planning, evaluation, design, and construction oversight experience has been obtained through work on multi-source groundwater systems and multi-process treatment systems, very similar to those of the City of Pompano Beach.

Mr. Caban began providing service to the City of Pompano Beach in 1999. He will assist Mr. Drake with the management and oversight of the various technical disciplines of the project team and assist with quality assurance and control program implementation.

Mr. Christopher is highly qualified in environmental engineering with special expertise in water resources, water quality, reverse osmosis, pumping system analysis/station design, hydraulic analysis, pipeline design, wastewater collection, treatment, effluent reuse/utilization/disposal, facility planning, construction and administration, and overall project administration and coordination. He is chief technologist for water quality for Tetra Tech. His knowledge of water chemistry and water infrastructure design makes him highly qualified in defining, evaluating, and implementing water quality solutions to the most challenging problems. He has 37 years of professional engineering experience and is highly qualified in environmental engineering, with special expertise in water resources, water quality, reverse osmosis and nanofiltration, granular activated carbon, pumping system analysis/station design, facility planning, construction and administration, and overall project administration and coordination.

He and Mr. Drake have worked together since 1985 on many hydrogeologic and engineering projects for new wellfields and water treatment plants, and historically on re-rating effluent disposal ponds. He continues to work with Mr. Dufresne on Port St. Lucie and Palm Bay projects.

Mr. Dufresne, with Ardaman & Associates, Inc., a Tetra Tech, Inc. company, has provided professional geological and hydrogeological services to municipalities, water and wastewater utilities, engineering companies, and private industry for 30 years. Services he provided include geological and hydrogeological studies, groundwater flow modeling, contaminant transport modeling, groundwater monitoring, water resource assessment, water use permitting, well and wellfield design, well construction services, aquifer performance testing, alternative water supply planning, aquifer storage and recovery, deep injection wells, environmental site assessments, and expert witness services. He has presented and published nearly 40 technical papers at several regional, national, and international conferences on various hydrogeological topics.

Mr. Andersen will provided quality assurance and quality control of all groundwater flow and transport modeling efforts for this project. He brings over 39 years of experience in groundwater hydrology and civil engineering. His professional expertise is in numerical methods in hydrology, groundwater hydrology, contaminant transport, surface water hydrology, computer programming, saltwater intrusion and aquifer water quality, wellfield analysis, and aquifer thermal energy storage. He serves as chairman of a peer review team for the Southwest, South, and St Johns River Water Management District to review and provide guidance on the development of the East Central Florida Transient Expanded (ECFTX) groundwater flow model using MODFLOW. He has constructed several groundwater flow models and transport model for the Miami-Dade region for use as a tool for water supply planning and development, and for FPL Turkey Point cooling pond analyses with respect to flow and transport modeling. Mr. Andersen met Mr. Drake in 1984 when Mr. Andersen was teaching a groundwater flow modeling class to the SJRWMD as a consultant.

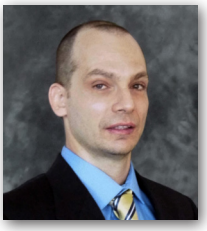
Mr. Lafrenz has over 30 years of experience in groundwater flow modeling, hydrogeologic investigations, well design, construction management and testing in surficial aquifer and Floridan aquifer projects. For the City, he will be the lead groundwater/transport modeling hydrogeologist, with JLA Geosciences providing expert input to model construction. Mr. Lafrenz brings practical application of groundwater flow modeling to the design of wellfields because of his well construction and aquifer testing experience. He has worked with Mr. Drake, Mr. Christopher and Mr. Dufresne on many wellfield and groundwater modeling related projects.

Ms. Alexander has extensive experience in design and construction management for raw and finished water transmission lines for the City of Hollywood and knows the

area very well. She has worked with Mr. Caban on the Hollywood project as well as others in southeast Florida. She provided field inspection and construction management oversight on over 100,000 feet of water main replacement for the City of Hollywood. For the City of Clearwater, she was responsible for the day-to-day client and project team management, coordination for plant site, 17-offisite remote wells/wellfield and 64,625 feet of pipelines ranging from 3- to 22-inches in diameter.

Mr. Zrallack, also with Ardaman, works out of the West Palm Beach office and has more than 20 years experience. His expertise includes final design and permitting. He provided geotechnical services throughout the southeast. He will lead the geotechnical investigation for raw water piping, wellhead investigations, as needed.

Mr. Voss will conduct the hydraulic modeling necessary to size the raw water lines and connect to the City's existing raw water system. He has conducted this type of design work for many utilities in south Florida and with Mr. Caban. He will use his expertise to design an efficient and cost-effective design of the new raw water lines in either or both wellfields. He will work with the City and with Mr. Scott Smith of Tetra Tech to simulate the operation of each well and the wellfields and assist with well pump and motor design to ensure that the raw water is delivered to the water treatment plant at the required pressures.



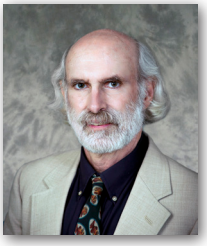
Mr. Smith will lead the wellhead facilities design activities, as he has done for many utilities in Florida. He works closely with Mr. Christopher on similar design projects and has designed many facilities that provided overall energy cost savings to our clients. He will also work with Mr. Wason on the electrical and instrumentation design of each wellhead. He will assist with the site location for the new wells and provide general input into the selection process. He will attend design meeting with the City as needed. He will work with Mr. Voss on sizing of discharge piping.

Mr. Wason will be the lead electrical and instrumentation engineer and work with Mr. Smith and Mr. Christopher on equipping each well and the power requirements of the pumps and motors to be used. He will provide design recommendations to the City and attend design meetings as-needed.

JLA GEOSCIENCES

JLA Geosciences, Inc. will be the hydrogeologic sub-consultant that will provide additional well deisgn, construction methods and water well construction management services to the City. JLA Geosciences has over 30 years of hydrogeologic investigations, wellfield design and construction management, and SFWMD experience in southeast Florida. They will bring an added level of this experience to Tetra Tech's hydrogeologic team. JLAs groundwater modeling team, Mr. Stout and Ms. Kuebler, have extensive south Florida experience, and with the SFWMD modeling and regulatory staff, and bring that extra knowledge to the City.

JLA and Tetra Tech are working together for Palm Beach County in the same manner as we propose for Pompano Beach.



Dr. Stout will report to Mr. Lafrenz and assist as needed with respect to the groundwater flow and transport modeling efforts. Dr. Stout has over 30 years professional experience in the general areas of water resource evaluation; groundwater investigations; and groundwater flow and geochemical modeling. His work experiences have involved positions in teaching, research, government, and technical consulting. Projects in Florida have concentrated on water resource development and water use permitting issues, primarily associated with the largest municipal public water suppliers and other large water users of the Floridan and Surficial Aquifers.

Ms. Kuebler will work with Mr. Lafrenz to develop the necessary conceptual and calibrated groundwater flow models to relocate the City's wells and wellfields. Prior to consulting, for almost 15 years, she served as a hydrogeologist and hydrologic modeler at the South Florida Water Management District supporting major program areas, including Water Supply Planning, Water Use Regulation. Ms. Kuebler has applied SFWMD surficial aquifer system (SAS) and Floridan aquifer system (FAS) MODFLOW and SEAWAT models for subregional and regional projects. She is a primary developer of the SFWMD LECSR Model, which is a combination and refinement of predecessor county-wide models of the SAS covering 7,500 square miles from Martin to Miami-Dade counties, and has applied LECSR to support multiple program areas (e.g., water supply planning, water use regulation, water shortages, engineering and initial design).

Mr. Friedrichs will be the primary well construction manager and will work with and report to Ms. Janine Alexander on well construction and testing. He will be responsible for construction and testing management and submitting to Tetra Tech staff daily reports, aquifer testing and water quality results, and other field work. He has over 14 years of experience providing well construction project management, technical oversight, well design and construction phase services. He has extensive experience in the construction of wells suitable for nanofiltratration (NF) and reverse osmosis (RO) feed water supply. His local experience in hydrogeologic investigations, drilling data acquisition, aquifer profiling, geophysical borehole log interpretation, aquifer performance testing, groundwater and surface water quality sampling will complement the expertise of Tetra Tech's hydrogeologists. Mr. Friedrichs oversees multiple well rehabilitation contracts for public water supply well rehabilitation projects, and as a primary field geologist on numerous Floridan Aquifer and Surficial Aquifer Water Supply wells, and Aquifer Performance Tests throughout Central and South Florida.

Ms. Smith provides experience in hydrogeologic field oversight during well construction and development phases; oversight for various drilling techniques including power auger, mud rotary, reverse air, Geoprobe, and core bores; geophysical log interpretation; implementation of well design and construction; hydrologic data collection; water quality profiling, performing field geologic analysis; and pump testing for Surficial and Floridan Aquifer projects in South Florida. Ms. Smith has overseen the construction of multiple Upper Floridan Aquifer Wells and provided 24-hour onsite construction management and coordination. Recent projects have concentrated on the construction and testing of Floridan Aquifer production wells associated with nuclear power cooling systems.

KEITH & ASSOCIATES, INC. consulting engineers

We will use Keith and Associates for providing land surveying services during the feasibility study and conceptual design, and then when establishing the proposed well locations prior to well construction and the drill rig being set-up on site.

Pace Analytical®

Pace Analytical Laboratories will conduct water quality analyses for primary and secondary drinking water standards and analyzing water samples taken during well construction. They will also run bacteriological samples to show that the new wells and rehabilitated wells meet FDEP disinfection requirements.

SPECIFIC PROJECTS SIMILAR TO POMPANO BEACH

The following are specific projects that the proposed project team have performed together. The full project descriptions are provided in the project experience section of our Letter of Interest.

City of North Miami Beach Upper Floridan and Biscayne Aquifer Wellfield and Water Treatment Plant

We established the capacity requirements for the new Floridan and Biscayne Aquifer supply wells, recommended locations where property was available and sanitary setbacks could be maintained or variances granted, determined the well design in terms of casing sizes and depths and open hole intervals and obtained the water use permit and prepared the well specifications for construction. Four new Floridan Aquifer wells were constructed to provide a capacity of 1850 gpm and five Biscayne Aquifer wells were constructed to provide a capacity of 2600 gpm. Tetra Tech also designed the well pumps, piping, instrumentation and controls for the wells.

South Miami Heights

Tetra Tech managed the project during the construction of a 5 MG potable water reservoir, high service pumping system, and water supply and disposal wells development program ahead of construction of the 20 MGD membrane softening plant. The well development program included water supply wells into the Biscayne and Floridan aquifers, a deep injection disposal well, and monitoring wells prior to construction of the membrane softening water treatment plant.

City of Port St. Lucie Wellfields and Water Treatment Plant

This work initially included rehabilitation of existing surficial aquifer wells, construction of new surficial aquifer well, and then moved to upper Floridan wells as the source water for two new RO water treatment plants. We conducted aquifer performance testing, well rehabilitation, designed and constructed new raw water lines and have obtained several water use permits for the City's JEA and Prineville wellfields.

City of Palm Bay, FL

Tetra Tech and several of the Pompano Beach proposed project team have worked since the early 1990s for the City of Palm Bay when they were considering getting into the water/wastewater business by taking over the GDU utility system. The work was, at first, smaller scale that the work proposed by Pompano Beach, but in the ensuing 25 years, has grown to approximately 14 mgd AADF. We are currently working to expand the south plant from 4 mgd to 8 mgd.

Toho Water Authority

Cypress Lake Wellfield WTP and Concentrate Disposal Management. TWA retained the hydrogeologic and engineering services of Tetra Tech to conduct extensive hydrogeologic investigation including the upper and lower Floridan aquifers for the purpose of developing a new 37.5 MGD raw water supply source for a proposed membrane water treatment plant. The exploratory well program included two test production wells, multiple monitoring wells, aquifer performance tests, water quality analyses, geophysical logging, groundwater flow and salt water upconing analyses, all of which culminated in the issuance of a 37.5 MGD water use permit by the SFWMD.

City of Lakeland Northeast and Northwest Wellfields

Since 1986, Tetra Tech conducted hydrogeologic investigations, conducted aquifer performance tests, designed and permitted the NE wellfield, conducted regional groundwater flow models for the impact analysis, and continue to conduct hydrologic and vegetative monitoring of the NE wellfield.

Surficial and Floridan Aquifer Wellfield Construction and Rehabilitation, Town of Jupiter Water System

JLA Geosciences (JLA) has designed and constructed 16 new surficial aquifer production wells for the Town of Jupiter Water System.The wells were successfully completed without screens in order to minimize maintenance and loss of capacity experienced with screened wells. The well construction techniques and final wellfield design were based on the results of a preliminary pilot test drilling and sampling program. Testing conducted during and after construction included sand testing, SDI testing, flow rate, and water quality. Pump testing and aquifer performance testing was conducted on wells to assess well yield and aid in selection of pump setting depths and recommended pumping rates. All of the wells have good productive capacities and three of the wells now have the highest capacities ever recorded for the Town of Jupiter. The majority of the wells produce over 750 gpm. Wells 68, 42, and 43 will produce 1000 gpm, 1350 gpm and 1300 gpm respectively. Sand content in the raw water from each well are below the target of 1 ppm at designed pumping rates.

Palm Beach County Water Utilities Department System-wide Wellfield Improvements Project WUD 16-017, Phases 1 & 2

JLA provided hydrogeologic consulting services to assist Palm Beach County Water Utilities Department in the system-wide rehabilitation and improvements of 21 wells located throughout Water Treatment Plants Nos. 2, 3, 8 & 9.

The scope of services included preliminary investigational work, smart wellfield analyses, well design, bidding, and construction phase services. The preliminary work for the project included pilot hole drilling, geotechnical investigations, ground penetrating radar, topographical survey, well siting, historical data review and existing well sites review. This preliminary work was used to develop a comprehensive scope of work for improvements and well construction approach for the 21 wells.

Preliminary work also included the development of a Smart Wellfield platform incorporating specific elements for each Water Treatment Plant and a fully functioning Smart Wellfield PBC user interface (for a 6-month historical time period) for the WTP 9 wellfield.

The scope included well design; wellhead, pump and motor design; new raw water main design, connection and tie-ins, electrical (including VFD) design and integration of smart wellfield improvements. The project also included assistance with bidding for both project phases. Construction management services for the project include construction project management; field oversight during critical phases of well construction including pilot hole drilling, geophysical logging, casing installation and cement grouting, completion interval drilling, review and recommendation for screen slots sizes, screen and gravel pack installation, pumping and water quality testing; vibration monitoring, contractor submittal, shop drawings and payment application review; and preparation of a well completion report summarizing well construction details and methods. Construction oversight also included oversight of civil, mechanical, and electrical work for both phases.

Water Supply Modeling, Permitting, and Water Use Permit Strategy Development, City of West Palm Beach

JLA assisted the City of West Palm Beach (City) in evaluating water supply options and obtaining a permit renewal from the South Florida Water Management District (SFWMD). JLA evaluated potential alternative sources for the City's water supply, including groundwater withdrawals from the Surficial and Floridan Aquifers, and also aquifer storage and recovery (ASR). JLA developed and applied a calibrated MODFLOW model of the Surficial Aquifer System (SAS) consistent with SFWMD requirements for consumptive use permitting. This model was constructed by extracting relevant input from the SFWMD Lower East Coast sub Regional (LECsR) MODFLOW model. According to the model documentation (SFWMD, 2006) the LECsR model is to be used as an interpretive and predictive tool to perform simulations of proposed water resource projects and/or operational schemes. JLA applied their calibrated SAS MODFLOW model to evaluate potential groundwater withdrawals by the City in the vicinity of Clear Lake/ Lake Mangonia. This included evaluating the possibility of replacing the City's surface water supply with 30 to 50 groundwater wells completed in the SAS adjacent to Clear Lake/Lake Mangonia. Analytical modeling of the Floridan Aquifer System (FAS) was performed to assess groundwater supply alternatives from the FAS, including two distinct wellfields to supply water for low-pressure reverse osmosis (LPRO) facilities. Modeling results were used to support the City in formulating future plans for water supply, including strategies for securing consumptive use permits from SFWMD.

Activities performed for this project reflect JLA Geosciences approach to groundwater modeling.

Florida Power and Light - Turkey Point Groundwater Monitoring Network Design, Permitting and Construction Management

JLA was contracted by Florida Power & Light Company (FPL) to provide hydrogeologic consulting services during construction of fourteen (14) monitor well clusters for the FPL, Turkey Point Plant Groundwater, Surface Water and Ecological Monitoring Plan (The Plan). The Plan was developed in cooperation with FPL, South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (FDEP) and Miami-Dade County Department of Environmental Resource Management (DERM) to identify the spatial distribution of Turkey Point Plant cooling canal system (CCS) water.

JLA services included; daily coordination with the well contractor and FPL; field construction observation during all phases of the project including exploratory coring, geophysical logging, sampling, measurement and testing services; ensuring contractor compliance with applicable regulations; evaluation of hydrogeologic, water quality, and geophysical data; and making monitor well construction recommendations for 42 discretely screened monitor wells in the Biscayne Aquifer System (BAS).

Drilling and construction activities were conducted under observation and scrutiny from FDEP, SFWMD, DERM, and Biscayne Bay National Park (BBNP) regulators tasked with ensuring FPL compliance to stringent regulatory requirements to work in environmentally sensitive areas within Biscayne Bay National Park (BBNP) and in isolated wetland areas around the Turkey Point Plant.

Upon completion of monitor well construction and testing activities, JLA compiled a comprehensive monitor well construction

summary report which included geologic descriptions, geologic interpretations, well construction details, and hydrogeologic cross sections in the study area. The JLA completion report underwent review and approval from SFWMD and FDEP.

MANAGEMENT PLAN

Without sound and rigorous project management, a project can quickly become disordered when sequences of tasks and milestones proceed in an unsystematic manner. Tetra Tech's management approach addresses project elements comprehensively so that work can progress according to the plan developed and agreed upon by the client and Tetra Tech at project inception. Effective implementation of the scope of services requires flexible leadership, clear expectations, consistent communication, and accountability of team members. Our project management approach assures clients the plan will be properly administered, and all issues that arise will be handled quickly so that they do not affect the schedule or budget adversely.

Our Project Management Plan (PMP) begins with the project team that is described in our submittal and continues with a plan that encompasses all tasks, schedules, budgets, meetings, and staff. The PMP guides the project and serves as the framework for project delivery. The PMP begins at the notice to proceed and continues through project closeout. We will provide our management plans to the City and each team member at the kickoff meeting. Once approved by the the City, these documents establish a process for Tetra Tech's project team members, our subconsultants, and client staff to follow. In addition, the PMP provides a collaborative technical process for the entire team.

Project Reports and Meetings

Progress meetings are scheduled monthly or at intervals determined by the the City. Monthly progress reports provide a summary of activities and deliverables completed during the specified period and outline the progress anticipated for the next period. These reports also summarize the project schedule and the budget for all design tasks. We meet with the City's project manager biweekly at a minimum or according to your preference. A written agenda distributed to team members in advance of the meeting outlines the issues to be addressed. After each progress meeting, our team will submit meeting minutes to the City's project manager. Our project manager will also prepare an action item list and decision log to capture work assignments and decisions determined in the meetings.

Project Scheduling

The realistic baseline schedule that we've presented in our submittal provides adequate time for client staff coordination and reviews, appropriate assumptions for permits and approvals, and stakeholder outreach and coordination. We will detail a series of work tasks and intermediate milestones in a Critical Path Method Flow Chart using Microsoft Project scheduling software. Before project initiation, we will submit the proposed project schedule with the PMP to the City's project manager. Subsequent schedule updates will be presented at the progress meetings. Tetra Tech's project manager monitors actual work progress relative to the established project schedule weekly and identifies corrective actions to maintain the schedule.

Budget and Schedule Tracking Tools

The PMP includes budgets for each task with key leads responsible for regularly monitoring financial performance. To manage the day-to-day project activities and advance the project according to the schedule and budget, our project manager employ's Tetra Tech's internal PM Portal, which is Tetra Tech's primary project reporting software system. This system provides quick access to a variety of reports for managing projects. The PM Portal includes a real-time PM Package one click away for all project managers. The PM Package includes eight reports designed to summarize the project's financial management needs. The project manager can view all charges to the project in real time through Tetra Tech's electronic accounting and management system, which is accessible from any location through the internet. Reports can be generated for budget status and monitoring, performance measurement, transaction review, cash management, and utilization. This system allows the project manager to dedicate the proper level of effort to the project while balancing resources and task budgets. Subconsultant budgets receive similar scrutiny.

Subconsultant Management

Subconsultants often provide an integral part of our project success. We have selected JLA Geosciences, Keith and Associates, and Pace Analytical subconsultants because they bring essential expertise to the project and can contribute to its timely and successful completion. We also selected them for their willingness and ability to work in a complex project environment and for their commitment to quality. Large projects often include substantial project teams with numerous subconsultants. Managing large teams, controlling the quality of the deliverables, and meeting budget and schedule goals requires clear lines of communication and responsibility amongst all team members.

Our subconsultants' work products and deliverables must be held to the same standards as Tetra Tech's. At the beginning of the project, we coordinate with the client to ensure the PMP includes key topics such as AutoCADD standards and other deliverable requirements. The PMP and related standards and requirements

are shared with subconsultants so that our work products remain consistent. We host our network files on a secure file system, so that Tetra Tech and our subconsultants can access all electronic files in real-time. In addition, our subconsultants' work is subject to the same QA/QC standards that Tetra Tech employs.

Quality Assurance/Quality Control

Tetra Tech's Quality Assurance/Quality Control (QA/QC) ensures all our projects meet or exceed our clients' needs. Our goal is to provide deliverables that are technically sound, high quality, cost-effective, and tailored to specific project objectives.

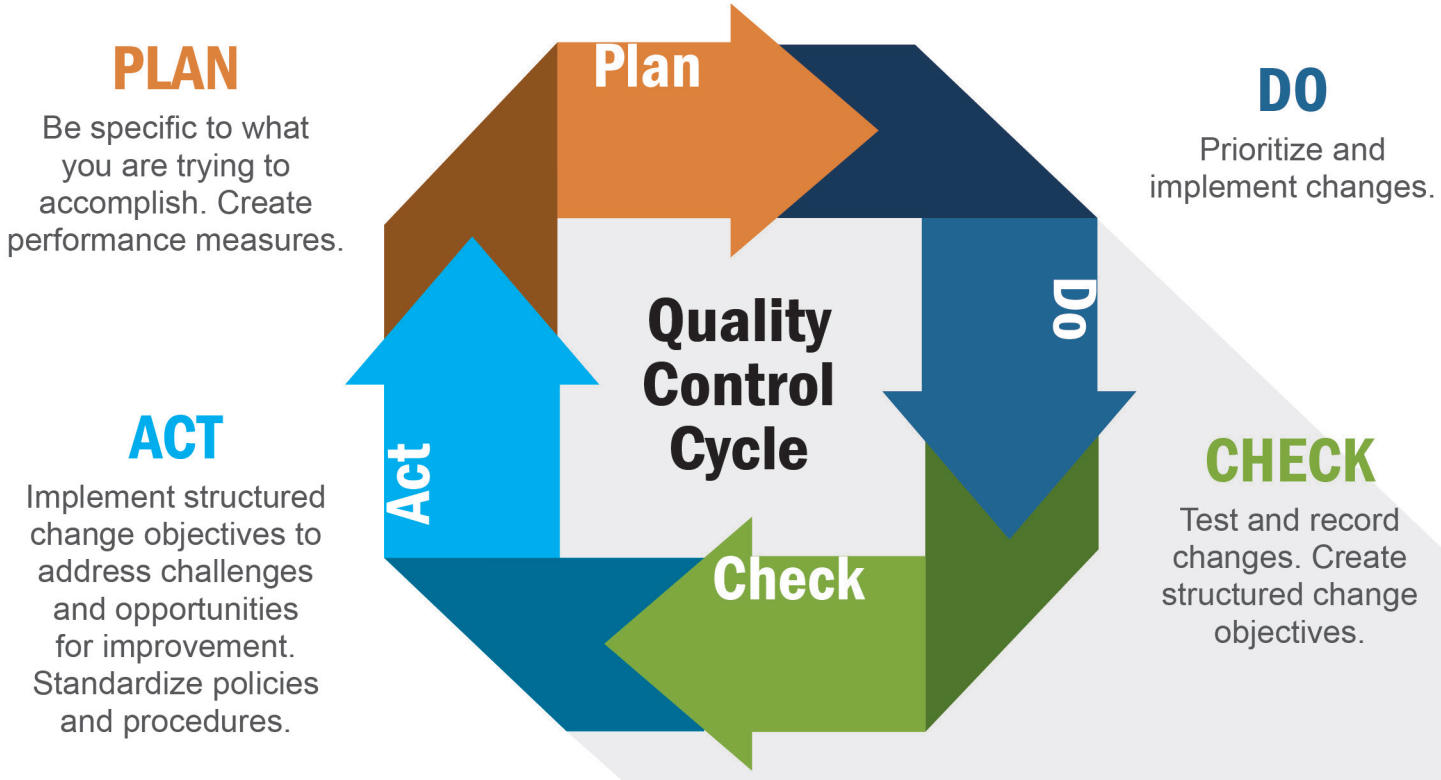
Tetra Tech implements a detailed QA/QC process where all deliverables, whether draft or final, undergo a formal review process prior to submittal to our client. The QA/QC Process will be managed by Mr. James Andersen, Mr. John Toomey and Mr. Pete Andersen, each are technical experts in their fields.

Our rigorous quality program applies to all our team members. Delivering services that fully meet our client's goals and expectations cost-effectively is critical. Tetra Tech's Quality Management System (QMS) is an internal set of practices and associated organizational structure established for planning and executing services that not only meet, but also surpass the quality requirements of our clients. These practices are implemented on all projects to provide deliverables that are technically sound, error-free, and cost-effective. While standardized, our QMS procedures are also flexible, allowing a level of customization to suit a wide variety of projects. We understand the need to balance innovation and creativity with the implementation of systematic processes for performance valuation and planning and design reviews.

Our quality plan will be included in our deliverables at the 30-, 60-, 90- and 100 percent design submittals. Tetra Tech's quality system approach applies the fundamental principles of the Plan-Do-Check-Act model of continuous improvement, highlighted in the graphic below. QA/QC activities are identified during project planning and applied throughout the project life. QA activities help guide the project work based on professional and regulatory standards. QC activities occur at key milestones to confirm project quality. Continuous improvement is achieved by applying these QA/QC activities and on future projects by employing lessons learned.

Our stringent quality approach allows our team to identify issues early and implement a corrective action plan to resolve discrepancies with minimal impact to the project. During the 30-, 60-, and 90-percent submittal reviews, if an issue arises we work with our client to develop a solution, implement the solution, and follow up to resolve the issue and provide closure so the project continues to progress. Tetra Tech provides QA/QC documentation to the client after each milestone, so a record of all activities exists and with buy-in from each discipline and the client recorded.

Improving Quality Control with the Plan-Do-Check-Act (PDCA) Model



We follow a four-step process focusing on planning activities and identifying outcomes, prioritizing, implementing, and recording changes. We follow this four-step process for all key milestones and deliverables. Deliverables are reviewed at three levels. A technical editor will conduct the first level to ensure proper formats, consistency, and clarity. A senior technical lead then conducts quality control to ensure technical aspects are correct, including details, references, scales, dimensions, and design calculations. This technical lead also verifies deliverables clearly and correctly describe the design concept and intent. The QA/QC manager, a senior-level individual not directly connected to the detailed design, performs a QC review of project deliverables independently. Tetra Tech staff also independently review subconsultant work before submission unless the work is specialized, in which case the subconsultant will identify an independent reviewer. Ultimately, Tetra Tech's project manager ensures that the quality of our deliverables maintains the quality of our deliverables meets our client's expectations before review.

Open Communication

Tetra Tech strongly believes open communication during all phases of every project is critical. By dedicating time in the schedule to meet with the City to fully understand the requirements of the project, Tetra Tech minimizes project re-design. Regularly scheduled progress meetings serve as one tool in our communication plan. Our clients depend on our outstanding responsiveness, which assures project issues are addressed and resolved in a timely manner and to the client's satisfaction. Our project manager maintains open communication among all team members to stay abreast of the progress of all tasks. Key team leads also operate with an open communication policy. Project success depends on sustaining regular communication among all team members and the client.

The project team is committed to working closely with the City of Pompano Beach to establish strong dynamic and open communication so that we can provide a completed project that meets the City's goals. The team that we are proposing is led by our Principal-in-Charge / Project Manager, Charles Drake, PG and supported by Kenneth Caban, PE, as our Assistant Project Manager, the team leadership will be supported by a highly skilled technical advisor/quality control team, scope area task leaders, and discipline specialists with additional expertise.

Team Members and Roles

Our team has been thoughtfully assembled and has extensive qualifications to deliver the services needed to implement the projects identified in the City's CIP. The table below provides a brief overview of our team's responsibilities and benefits to the City.

FIRM NAME	RESPONSIBILITY	BENEFITS TO THE CITY
Tetra Tech	Prime	• Full-service engineering and hydrological firm • Knowledge of City facilities • In-house services
Keith and Associates	Survey/GIS	• MBE and SBE firm • Local business • Existing relationship with City through previous experience
Pace Analytical Services, Inc.	Water Quality Laboratory	• Local business • Existing relationship with City through previous experience
JLA Geosciences	Hydrogeology	• Local experience • Construction expertise • Proximity to City

pompano beach
Florida's Warmest Welcome

RESUMES OF KEY PERSONNEL

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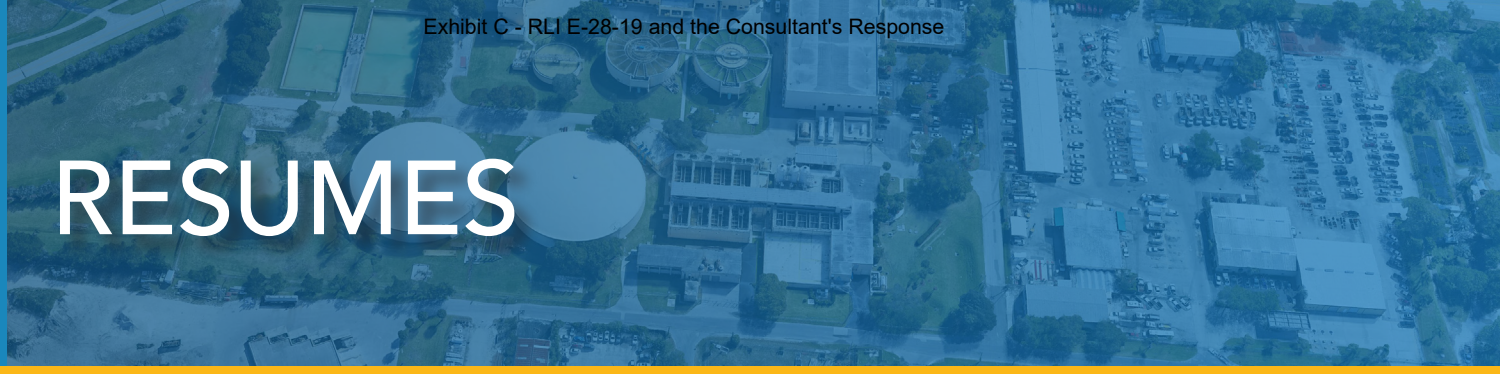
TETRA TECH



RESUMES

Key Team Members

Other Support Disciplines

CHARLES (CHUCK) DRAKE, PG, CPG
PRINCIPAL-IN-CHARGE, PROJECT MANAGER

Mr. Drake has 36 years of experience in groundwater resource testing and evaluation across Florida for all aspects of water supply and aquifer recharge projects for public utilities. His experience in south Florida started with Port St. Lucie in the late 1980s and North Miami Beach in 2001. His experience includes aquifer performance test and analysis, design, permitting and construction management of fresh and brackish groundwater wellfields, deep injection wells for RO concentrate, and aquifer recharge in many different hydrogeologic conditions. He has worked with and obtained water use permits from the SFWMD starting with the Port St. Lucie wellfield projects.

Since 1985, Mr. Drake has been a consultant primarily to public utilities on well/wellfield design and permitting, wetland hydrology, and implementation of new water supply projects. Mr. Drake is a qualified expert witness in hydrogeology, well construction, groundwater flow, and solute transport modeling, water use permitting, and water resource planning. He has provided expert witness testimony on several litigation cases for proposed wellfields, landfill, and wetland hydrology projects.

He has designed and permitted wellfields from a million gallons per day to over 30 MGD AADF. He has designed both screened wells in the surficial aquifer and open hole deep wells in the upper Floridan aquifer.

Over the last ten years, he's been involved primarily with overall program planning, obtaining funding from state agencies and the Florida legislature, and providing technical expertise to public clients for their public outreach programs on water issues. He couples his technical/regulatory experience with public speaking to meet with the public and explain and describe hydrogeologic projects in a manner that the general public can understand. He is very active the Florida Association of Professional Geologists and the Florida section of the WateReuse Association.

EXPERIENCE

City of Port St. Lucie, FL-Wellfields and Water Use Permitting, FL. Surficial aquifer well design and construction, and well rehabilitation. Increased well yield over 30% and obtained SFWMD WUP for over 10 MGD.

Norwood -Oeffler Wellfield and Water Use Permitting, North Miami Beach FL. Site selection for new wellfield, feasibility study and exploratory program; water use permitting for new wellfield to supply water Norwood-Oeffler WTP.

Coastal Ridge and Golden Gate Wellfields, ASR Exploratory Well, City of Naples, FL. Rehabilitation and testing of Coastal Ridge and Golden Gate wells increasing well yield more than 50% and eliminating the need for new well construction. Obtained water use permit for over 20 MGD AADF.

Cypress Lake Wellfield Exploratory Well Program and WUP, Toho Water Authority, FL. Initiated lower Floridan aquifer exploratory wellfield program for Toho to supply 37.5 MGD AADF to a proposed RO WTP. Cypress Lake Wellfield is the first lower Floridan aquifer wellfield and the water treatment plant will be the first RO plant in central Florida. The exploratory well program consisted of the Bronson well to a depth of approximately 2,200' bls, established the depth of the Avon Park Producing Zone which at the time was unknown; constructed three lower Floridan and one upper Floridan aquifer monitor wells. Aquifer performance and step-drawdown tests were run and used in conjunction with water quality with depth samples to design the production wells. Modflow

EDUCATION

BS, Geology, University of Florida, 1982

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #37, 1988

AIPG, Certified Professional Geologist, No. 11179

YEARS OF EXPERIENCE	36
YEARS WITH TETRA TECH	29

groundwater flow modeling showed that the optimum well spacing would be approximately 0.5 miles, and that ten wells would be required to provide 37.5 MGD. Because of the well spacing, Toho decided to bracket the water quality and well yield by constructing an exploratory well and monitor well similar to the Bronson site, on the Chapman site. Well yield and water quality were very similar so that gave Toho confidence that the proposed water treatment process would be sufficient to treat water from all wells.

Northwest and Northeast Wellfield and Water Use Permits, City of Lakeland, FL. Initiated site selection for a new wellfield property northeast of the City to provide redundant water supply and to a new water treatment plant. 880 acres were identified and the City leased the property and conducted an exploratory well program and ran multiple aquifer performance tests to determine well and wellfield yield and raw water quality. One criteria was that the wellfield impacts, as defined by the SWFWMD, were contained on the 880 acre property.

With the hydrogeologic criteria and water use permitting criteria, the wellfield was designed for 9.0 MGD AADF and 13 MGD MDF. The original water use permit was obtained in 1991 and last renewed in 2008 for a 20 year duration, with a 10 year extension available upon request.

Shell Creek Reverse Osmosis Wellfield and Water Use Permit, City of Punta Gorda, FL. Lead Hydrogeologist and Client Manager at the initiation of this project. Mr. Drake was responsible for providing technical assistance to the City in obtaining cost share funding from the Southwest Florida Water Management District and grant funding from the Florida Legislature. He worked with City management and the mayor and some council members in the funding effort. He was also responsible for meeting with the District regulatory staff to discuss water use permitting issues, and from that, develop an exploratory well testing program to collect sufficient data to design the wellfield to produce approximately 4.0 MGD of raw water, groundwater quality data for Tetra Tech engineers to design the reverse osmosis water treatment plant, and to construct a numerical groundwater flow model using DWRM3 to obtain a water use permit. The work also included conceptualization of an injection well for reverse osmosis concentrate disposal. The exploratory well program is nearing completion, a request for additional information has been answered, and the injection well construction is well underway.

Winson WTP Well Rehabilitations, City of North Miami, FL. Hydrogeologist involved in the review of project specifications prepared by another consulting firm prior to bidding for selection of drilling/well rehabilitation contractor. Project includes well evaluation, rehabilitation, testing, and technical reporting for six Biscayne aquifer wells and included upgrades to well heads, vertical turbine pumps, and piping.

KENNETH CABAN, PE, BCEE, LEED AP
ASSISTANT PROJECT MANAGER

Mr. Caban has over two decades of experience in all facets of water supply, treatment, and transmission. He has led numerous water supply projects and multidisciplinary teams for the analysis, design, permitting, inspection, construction management, and program and project management of water systems.

EXPERIENCE

Water, Wastewater, and Reclaimed Water Master Planning, Miami-Dade County Water and Sewer Department, FL. Quality Manager responsible for updating and maintaining a comprehensive plan for the future of its water, wastewater, and reclaimed water utility infrastructure. Services provide hydrogeologic services, hydraulic modeling, flow projections, master planning, operational studies, hydrogeological evaluations, geological evaluations, process optimization, cost estimating, scheduling, and additional engineering support services as requested by MDWASD.

Rehabilitation of Six Biscayne Aquifer Public Water Supply Wells, City of North Miami, FL. Project Manager and Technical Reviewer. Served as an extension of staff to assist in reviewing contract documents, well rehabilitation activities, well rehabilitation videos, and post rehabilitation water quality for the rehabilitation to six Biscayne aquifer water supply wells as part of the its plans to rehabilitate and upgrade its existing water supply, treatment, storage, transmission, and distribution systems. Also provided project management and construction management assistance during rehabilitation to coordinate with the well rehabilitation contractor.

Winson Water Treatment Plant Owner's Engineering Representative: Water Transmission System Design and Water Supply Facilities Work Plan, City of North Miami, FL. Project and Quality Manager. Engineering services for the installation of a 6-inch diameter water transmission main and update to the Water Supply Facilities Work Plan. For the transmission system design, services include survey, geotechnical engineering, design, permitting, and construction administration and periodic observation services for approximately 3,600 linear feet of 6-inch diameter water main along N.E. 6th Avenue between N.E. 137th Street and N.E. 148th Street. These improvements address peak hour, fire flow, and/or water age issues. The Work Plan Update is based on past historical data, current information, and future projections associated with the City's sole municipal water treatment facility, water conveyance infrastructure, demographics, water sources, water demands and water supply. It covers a planning period of 2014 through 2030.

Alexander Orr Jr. Water Treatment Plant Residuals Management Plan (20-Year Water Facilities Master Plan Update), Miami-Dade County Water and Sewer Department, FL. Project Manager for the residuals management plant which incorporates residuals management plans for the Hialeah and Preston Water Treatment Plants. As part of this project, current operational and maintenance practices and equipment were evaluated,

EDUCATION

MS, Environmental Engineering, Florida International University, 2007

BS, Civil Engineering, Florida International University, 1997

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #59276

Board Certified Environmental Engineer (BCEE)

Leadership in Energy and Environmental Design Accredited Professional (LEED AP)

YEARS OF EXPERIENCE	23
YEARS WITH TETRA TECH	9

as well as current and future lime sludge production rates. An analysis of the lime sludge lagoons was performed and a lagoon cleaning program was prepared. Alternatives were developed, evaluated, and selected.

Groundwater Modeling, Wetlands Impact Assessment, and Wellfield Operational Plan (20-Year Water Facilities Master Plan Update), Miami-Dade County Water and Sewer Department, FL. Project Manager conducting various groundwater modeling tasks necessary to satisfy several requirements of the Interim Water Use Agreement and necessary for issuance of a 20-year Water Use Permit. Project consisted of groundwater modeling of the Biscayne aquifer using the SFWMD LECSR model to identify wetlands and regional system impacts and to prepare a wellfield operational plan for the Biscayne aquifer. Various withdrawal and recharge simulations were conducted under 1 in 10 year drought conditions in accordance with the SFWMD Basis of Review. Modeling of the Upper Floridan aquifer was also conducted to evaluate the recharge/withdrawal impacts associated with this alternative water supply.

Alternative Water Supply Investigation and Water Use Permitting Assistance (20-Year Water Facilities Master Plan Update), Miami-Dade County Water and Sewer Department, FL. Project Manager to conduct this five-part project, which consisted of preparing a 10-Year Water Facilities Work Plan as required by the Department of Community Affairs, Groundwater Recharge Projects Evaluation, Stormwater Storage and Recharge, preparing water demand forecasts utilizing a Traffic Analysis Zone (TAZ) Methodology, and to assist MDWASD with preparation of various technical submittals to support issuance of a 20-year Water Use Permit. Included in this analysis was a quantification of future water demands, the effect of conservation and reuse, the identification and quantification of alternative sources to supply future demands.

Initial Water Use Permitting Assistance (20-Year Water Facilities Master Plan Update), Miami-Dade County Water and Sewer Department, FL. Project Manager. Assisted with initial water use permitting activities for the renewal of MDWASD's 20-year Water Use Permit. This included preparation of support data, including population, historical water use, projected water demand, and initial evaluations of alternative water supplies and water conservation and reuse measures.

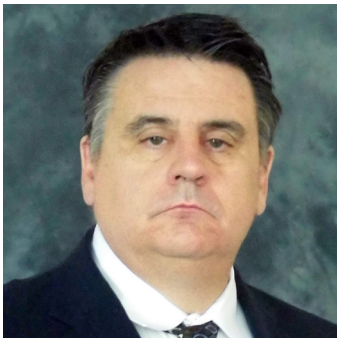
Consulting Services Engineering WTP Filter and High Service Pumps 1-4 Building, City of Pompano Beach, FL. Quality Manager. Engineering design, permitting, bidding, and construction administration services to prepare design documents for the identified hurricane hardening improvements at the Filter Buildings of the Pompano Beach Water Treatment Plant, based on a recent WTP Hurricane Hardening Study completed by Tetra Tech in June 2015. The Filter Building encompasses the High Service Pumps 1-4, Office, and Filter Operation Gallery.

Lake Estates Water Main Improvements Project (NE 56th Court to NE 60th Street between N. Federal Highway (US1) and Bayview Drive), City of Ft. Lauderdale, FL. Quality Manager for the water main improvements project consisting of 10,850 feet of 8-inch diameter water main, removing existing fire hydrant assemblies and replacing with new fire hydrant assemblies, new water services to existing meters and backflow devices. The water main will be constructed within City and FDOT ROWs using the open cut method of construction with the existing water main being placed out of service and grouted (7,660 feet), pavement removal and replacement sheets. Bidding services included preparation of bid documents, attending the pre-bid conference, bid questions/clarifications, bid tabulation and evaluation with recommendation of award. Construction services include progress meetings, periodic inspections, review of shop drawing submittals, RFIs, pay application and change order reviews and approvals, substantial and final completion and punch lists, final clearances and certifications and record drawings to the City.

Miami International Airport Water Master Plan Update, Miami-Dade County Aviation Department, FL. Project Manager. The 15-year master plan was updated to provide information on the modified water systems, existing water use, projected water demand projections, current and future regulatory requirements, capital improvements program, and operation, testing, and maintenance requirements of the water system. This planning effort addresses the initial and future capital needs of the water utility system to correct existing deficiencies and to accommodate future development of Miami International Airport.

Water Main Replacement Program, City of Hollywood, FL. Quality Manager overseeing the surveying, geotechnical evaluations, design, permitting, and construction administration services on multiple projects being completed concurrently. The entire program is comprised of over 300,000 linear feet (57 miles) of water main replacement, reconnection of over 1,000 service connections, numerous underground and overhead utilities conflicts, permitting through multiple agencies, and construction within schedule and budget. Existing aged cast iron water mains were replaced with both DIP and PVC water mains, ranging from 4-inch to 24-inch diameters. The existing water mains were located within residential streets, paved and unpaved alleys, and easements in the rear of residential lots, which had become overgrown or encroached upon by property owners. Existing water meters located within unpaved alleys or rear easements were relocated to the front of the lots and included new water services within private property. Aged fire hydrants were replaced some water mains were upsized by one nominal size. Extensive asphalt pavement and pavement markings restoration and improvements were also included.

JOHN TOOMEY, PE
QUALITY ASSURANCE/QUALITY CONTROL



Mr. Toomey has nearly 40 years of responsible engineering experience in planning, design, and construction administration of various water and wastewater projects. He currently serves as the water/wastewater discipline leader for Tetra Tech's IER unit. Duties include: technical oversight; staff recruitment, evaluation, and mentoring; workload assessment and balancing; business development and proposal development; and detailed technical involvement on selected projects. A brief overview of selected project experience is presented below.

EXPERIENCE

Southeast Water Treatment Facility, Huntsville, AL. new raw water intake, pumping facility, and conventional surface water treatment plant with a capacity of 24 MGD and provisions for expansion to 96 MGD. The treatment plant includes mixing, flocculation, settling, filtration, GAC contactors for DBP control, disinfection via free chlorine, pH adjustment, fluoridation, addition of a scale/corrosion inhibitor, and finished water pumping as well as residuals handling facilities.

Price Creek Water Treatment Plant, Lake City, FL. A new wellfield and WTP with a capacity of 9.00 MGD. Facilities include 4 wells, ozonation system, chemical feed systems, ground storage tanks, high service piping facilities, and related electrical and instrumentation systems.

Well No. 10 and Water Treatment Plant, Plant City, FL. A new 3,500 GPM well, ground storage tank, chemical feed facilities and high service pumps. The project included an evaluation of storage options and a comparison between bulk purchase on-site generation and of sodium hypochlorite.

Winterset and Winterset Gardens WTP Improvements, Winter Haven, FL. Improvements at each plant included a 0.5 MG ground storage tank with a cascade aerator, high-service pumping facilities, a new standby generator, and related electrical, instrumentation, and SCADA facilities.

Northwest Regional Water Reclamation Facility Rerating, Hillsborough County, FL. A detailed analysis of flows, influent characteristics, and plant performance in conjunction with a computer modeling effort in order increase the permitted capacity of a 10 MGD BNR facility to 12 MGD with only minor improvements.

Northwest Regional Water Reclamation Facility Expansion, Hillsborough County, FL. Process analysis and preliminary design in conjunction with a computer modeling effort in order increase design and permitted capacities from 12 MGD to 30 MGD.

Bates Avenue WWTP Nitrogen Reduction Improvements, Eustis, FL. Development of value engineering recommendations associated with compliance with the Wekiva Act and subsequent implementation of recommendations. An option that involved modifying existing process trains to facilitate the use of the step-feed activated sludge process resulted in a capital savings to the City of over $5,000,000 without sacrificing rated capacity or reliability.

EDUCATION

BSE, University of Central Florida, Environmental Engineering, Magna cum Laude

AET, Vermont Technical College, High Honors

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #40264, Georgia, #PE041116

YEARS OF EXPERIENCE	40
YEARS WITH TETRA TECH	20

Howard F. Curren Advanced Wastewater Treatment Plant Process Optimization Study, Tampa, FL. Development and examination of five distinct alternatives to minimize energy consumption and methanol usage at the City's 96 MGD AWT facility. Options involved various centrate treatment and suspended growth denitrification options as well as elimination of the carbonaceous stage HPO system in favor of a conventional mechanical aeration technology.

Lift Station No. 1/7 Improvements, Orlando, FL. A new 25 MGD wastewater pump station and that includes a split wetwell, provisions for the installation of six 250 HP pumps, above-grade discharge piping, variable frequency drives, odor control system, flow metering facilities, a monorail system, standby power facilities, and a building that is architecturally consistent with the surrounding neighborhood.

Bennett Road Bypass Facility Project, Orlando, FL. Wastewater pumping and transmission main facilities to increase the capacity of the Bennett Road/Crane Strand Transmission System from 22 MGD to 44 MGD. The facilities included multiple variable speed submersible pumps along with odor control and standby power facilities.

Lift Station No. 69 Upgrades, City of Orlando, FL. Replacement of three 3,000 GPM dry pit pumps along with wet well rehabilitation, building improvements, and replacement of the odor control, electrical, and standby power facilities.

Miscellaneous Lift Station Improvements, Orlando, FL. Over 25 lift station refurbishments involving a variety of improvements ranging from site and electrical enhancements to complete station replacement.

Hunter's Creek/Meadowoods Interconnect, Orange County, FL. Three major wastewater pumping stations with peak flow capacities ranging from 11.7 MGD to 17.6 MGD. The facilities include multiple constant speed submersible pump systems along with odor control and standby power facilities.

Group 5A Pump Station Improvements, Orange County, FL, Rehabilitation of existing tributary sewers, installation of fiberglass wet well liners, pump replacement, new above-grade discharge piping, odor control systems, new controls, standby power facilities, CMU screen walls, and miscellaneous site improvements at two existing wastewater pump stations.

International Corporate Park Wastewater Pump Station Improvements, Orange County, FL.A new major wastewater pump station and rehabilitation of an existing submersible pumping facility. The new station included a split wetwell, provisions for the installation of six pumps, above-grade discharge piping, variable frequency drives, an odor control system, flow metering facilities, a standby power system, telemetry, and an electrical building.

Potable Water Master Plan, City of Winter Haven, FL. A comprehensive evaluation of potable water supply, treatment, storage, and distribution facilities for the City of Winter Haven. The project included an analysis of existing demands, projection of future demands, an extensive computer modeling effort and the development of a phased capital improvements program.

Potable Water Facilities Plan, City of Lake City, FL. An analysis of potable water treatment options pursuant to requirements established for the State Revolving Fund (SRF) Loan Program. The project included flow projections, an evaluation of capital and operating costs for various alternatives, consideration of various non-monetary factors and selection of an overall strategy for providing potable water treatment capacity for a 20-year planning period. The project also included preparation of a "Capital Financing Plan."

Downtown Sewer Master Plan, Orlando, FL. A detailed examination of the City's wastewater collection and transmission systems that serve the Downtown Orlando Area. The assignment involved coordination with the Planning Department, Orlando Venues, and the Wastewater Division in addition to the development of a computer model to assess system capacities under existing and projected conditions. The final report included a condition assessment of selected facilities as well as a phased capital improvements program.

Wastewater System Evaluation Study, City of Lakeland, FL. A detailed study of the City's wastewater collection, treatment and disposal facilities for a 20-year planning period. The project included an evaluation of various regional and sub-regional treatment options as well as an evaluation of pretreatment alternatives for a high-strength industrial wastewater. Also, the project included a large computer model of the City's wastewater transmission system to evaluate various options under existing and projected flow conditions. A phased capital improvements plan was also developed as part of the project.

PETER ANDERSEN, PE
QUALITY ASSURANCE/QUALITY CONTROL

Mr. Anderson has over 39 years of experience in groundwater hydrology and civil engineering. Professional expertise with numerical methods in hydrology, groundwater hydrology, contaminant transport, surface water hydrology, computer programming, saltwater intrusion and aquifer water quality, wellfield analysis, and aquifer thermal energy storage.

He is a nationally recognized expert in groundwater flow and transport modeling. He provides subject expert peer review services for water management districts in Florida. He has also provided expert witness testimony in several administrative cases in Florida.

EXPERIENCE

Southwest, South, and St Johns River Water Management District, FL. Serving as chairman of a peer review team that is reviewing and providing guidance on the development of the East Central Florida Transient Expanded (ECFTX) groundwater flow model using MODFLOW. Fellow peer reviewers are Drs Mark Stewart and Louis Motz.

Florida Power and Light Company, Florida City, FL. Project Manager for a project to develop a variable density SEAWAT model of the groundwater and cooling canal system surrounding the Turkey Point power generation plant. Integrated a large amount of recent and historical data and calibrated the model to over 40 years of movement of saline and hypersaline water. Used the model to support the design of a Recovery Well System to remove hypersaline water from the aquifer. Presented results to stakeholders and performed modifications to the study to address concerns.

Florida Power and Light Company, Palm Beach County, FL. Conducted groundwater flow modeling (MODFLOW) in support of site certification for the West County Energy Center. Performed initial groundwater modeling to assess impact of water use and later modified the model using site-specific hydraulic parameters derived from an aquifer test.

St. John's River Water Management District, Palatka, FL. Project Manager for developing, calibrating, and applying a transient groundwater-surface water flow model for MFL development in a series of connected streams and karst lakes near Keystone Heights, Florida. Surface water features were represented using MODFLOW's Lake (LAK3) and Streamflow Routing (SFR2) Packages. Also developed historic model input datasets based on long-term climatological data and statistical techniques.

Florida Power and Light Company (through Golder Associates), Okeechobee County, FL. Performed an initial water supply assessment for a new power plant near Ft. Drum. Later, assisted FPL in technical discussions with the St Johns River Water Management District and Indian River County for obtaining permits for a water supply of 9 mgd. Performed groundwater modeling to determine impact on existing legal users in the area around the wellfield. Prepared for a site certification hearing, which was not contested.

Florida Power and Light Company, Florida City, FL. Project Manager for technical analysis for certification of a 125 mgd backup water supply for two new nuclear units at the Turkey Point electrical power plant. Conducted numerical modeling using MODFLOW and SEAWAT to assess the feasibility of infiltrating ocean water through a series of laterals extending beneath Biscayne Bay from on-shore caissons. The model was also used to design and analyze a 10,000 gpm aquifer test and to predict the environmental impact

EDUCATION

MS, Civil Engineering, Department of Civil Engineering, Auburn University, 1980

BCE, Civil Engineering, Department of Civil Engineering, Auburn University, 1977

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer: Virginia, #014511, Georgia #028802, Alabama #26482, Florida #62133

YEARS OF EXPERIENCE	39
YEARS WITH TETRA TECH	30

of operating the radial collector system. Provided peer review of another contractor's work related to the regional impact of the radial collector wells. Testified in the Site Certification hearing on nature of the impacts and compliance with State and County statutes and codes.

Westinghouse Savannah River Company, SC. Program Manager for a task order contract for groundwater modeling services. The tasks ranged from determining the extent and risk of groundwater and soil contaminated with solvents, metals, and/or radioactive byproducts to evaluating the effectiveness of various remedial alternatives. Contaminants of concern for these analyses included solvents, metals, and radionuclides (tritium, uranium, plutonium, radium). Conducted or managed work using MODFLOW, MT3DMS, MODFLOW-T, MODPATH, HELP, FTWORK, GMS, VZCOML, GOLDSIM, ArcView/GIS, ZONEBUDGET, TRAMP.

South Florida Water Management District, FL. Served as chairman of a peer review team, also consisting of Dr. Richard Peralta and Dr. John Shafer, for a subregional model, Lower East Coast subRegional (LECsR) developed by District staff. The model was of significant complexity and included groundwater/surface water interactions. Led weekly teleconferences and was in charge of developing a report on the findings of the peer review team.

LITIGATION EXPERIENCE

Has served as an expert witness at 15 administrative hearings; gave depositions on 16 occasions for administrative hearings and Federal court bench trials.

TEACHING EXPERIENCE

Has taught introductory, intermediate, and advanced level groundwater modeling courses on 69 occasions to clients including International Groundwater Modeling Center, USEPA, BP America, U.S. Army Corps of Engineers, South Florida Water Management District, Shell Oil Company, and Sonoma County Water Agency.

PUBLICATIONS

Has authored or co-authored 12 peer-reviewed articles in journals including Water Resources Research and Ground Water. Has authored or co-authored 42 conference presentations. Author of A Manual of Instructional Problems for the U.S.G.S. MODFLOW Model, a training document prepared for the U.S. Environmental Protection Agency.

JAMES L. ANDERSEN, PG
QUALITY ASSURANCE/QUALITY CONTROL, JLA ASSOCIATES

President of JLA Geosciences, Inc., Jupiter, Florida responsible for company operations, project management, technical oversight, well design and construction phase services team leader. Mr. Andersen has over 30 years working experience in hydrogeology, groundwater water resource investigations, well field design, construction, development, well problem evaluations and well rehabilitation. He has been responsible for the construction of and completion of hundreds of water supply wells in South Florida including over 100 in the Upper Floridan Aquifer. He has an extensive groundwater experience, working with coastal plain aquifer systems; well design; groundwater monitoring, geophysical well logging and interpretation; reverse osmosis (RO) raw water supply investigations and RO concentrate disposal by injection well; aquifer performance testing, analysis and computer modeling; wellfield contamination investigations, collection and analysis of water quality data; rehabilitation of old wells, and supervising various types of drilling. Mr. Andersen has served as a Florida Chamber of Commerce short course instructor for environmental permitting, an invited speaker for the Florida Department of Environmental Protection on contamination cleanup, a regular conference speaker for AWWA, AWRA, AGWT, AMTA and SEDA on topics such as Aquifer Storage and Recovery, hydrogeology, water use permitting and well design, construction and rehabilitation strategies. Jim serves on the Southeast Desalting Association and Palm Beach County Natural Resources Protection boards. He is also on the board and Secretary of Connect Consulting, Inc., a hydrogeologic and well rehab specialty consulting firm.

EXPERIENCE

Principal Hydrogeologist/Project Hydrogeologist, Town of Jupiter, Surficial Aquifer Wellfield Testing (2019) Testing of the Town's in service Surficial Aquifer (SA) production wells at their maximum designed, safe pumping rates. Includes evaluation of pump performance, pumping water levels, water quality and specific capacity. SCADA system also evaluated. Analysis of results and evaluation of previous data provided to the Town with a comprehensive report identifying trends in production well performance and recommendations for rehabilitation.

Principal Hydrogeologist, Seacoast Utility Authority, Groundwater Modeling and Application for Letter Modification, Palm Beach Gardens, FL (2019) Project included i) updating the existing MODFLOW groundwater model to include refined grid spacing around the North Palm Beach Wellfield (NPBWF; ii) evaluating the impact of combining the Burma Road Wellfield (BRWF) and NPBWF CUP allocations into a single combined allocation, to provide SUA with more flexible wellfield operation; iii) preparing and submitting the CUP letter modification application to SFWMD; and iv) responding to anticipated SFWMD requests for additional information (RAI) letters.

Principal Hydrogeologist/Project Hydrogeologist, PBCWUD, System-Wide Wellfield Improvements Project WUD18-051 (2019-Ongoing) Project included design, bidding, construction and testing for improvements to 37 wells across WTPs Nos. 2, 3, 8 & 9. Well improvements include electrical upgrades, pump and motor replacements, well replacements, and well rehabilitations. Project is current in design phase.

Principal Hydrogeologist/Project Hydrogeologist, PBCWUD, UFA/ASR Rehabilitation Design and Bidding (2018-Ongoing) Project included design specifications and bidding assistance for rehabilitation of PBCWUD WTP 11 UFA production wells and WTP 3 & WTP 9 ASR wells.

Principal Hydrogeologist/Project Hydrogeologist, South Martin Regional Utility, N-15, R-4 Design, Permitting, Bidding, Construction (2018-Ongoing) Project included design, permitting, bidding, and construction of SMRU North Plant Supply Well N-15 and Remediation Well R-4.

EDUCATION

BS, Geology, Florida Atlantic University, 1985

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #1103

40 hour Hazardous Materials Health and Safety Training, Geraghty & Miller, 1989.

YEARS OF EXPERIENCE	34
YEARS WITH JLA	16

Principal Hydrogeologist/Project Hydrogeologist, Town of Jupiter, Wellfield 4 SFWMD Modeling and Permitting (2018) Project included groundwater modeling and SFWMD permitting assistance for wells in TOJ Wellfield no. 4, north of Indiantown Road, including SFWMD letter modification and well siting.

Principal Hydrogeologist/Project Hydrogeologist, Town of Jupiter, Wellfield 2 test wells and permitting (2018-Ongoing) The Town's Old Wellfield Number 2 (WF#2) located on Central Blvd, west of the water treatment plant includes surficial aquifer production wells 6 through 11. The wells are planned for replacement in FY2019 and are currently out of service because of persistent bacteriological and water quality problems. The project includes identifying four (4) potential new well locations and a replacement well location for failed well 12, installing two (2) test wells to assess the water quality of the surficial aquifer at the site and to aid in the design of the replacement production wells, data analysis and reporting, and assistance with the modification of the Town's water use permit no. 50-00010-W.

Principal Hydrogeologist/Project Hydrogeologist, Seacoast Utility Authority (2018-2019) Project included design, construction, and testing of one (1) Upper Floridan Aquifer Production well F-9.

Principal Hydrogeologist/Project Hydrogeologist, Private Client Upper Floridan Aquifer Wellfield, Okeechobee, Okeechobee County, FL (2017) Project included design, construction and testing of three (3) 36-inch diameter steel Upper Floridan aquifer production wells, and one (1) 24-inch diameter FRP APPZ production well. Provide hydrogeologic oversight and construction management for multiple contractors on an aggressive construction schedule. The project resulted in the completed wells meeting the design pumping rate of 2800 gpm and all wells constructed on schedule.

Principal Hydrogeologist/Project Hydrogeologist, PBCWUD, System-Wide Wellfield Improvements Project WUD16-017 (2017-2020) Project included design, bidding, construction and testing of 21 surficial aquifer production wells across WTPs 2, 3, & 9. Project included preliminary investigations including GPR, survey, well siting; Smart wellfield analysis; and well design, bidding, and construction phase services. Project construction cost: $12M. Project is currently in construction phase.

Principal Hydrogeologist/Project Hydrogeologist, 2017 Rehabilitation of Water Treatment Plant No. 3 & 9 Surficial Aquifer Production Wells, Palm Beach County Water Utilities Department, Delray Beach and Boca Raton, Florida (2016-2017) Provided hydrogeologic consulting services during design, bidding, and construction phases for rehabilitation program of WTP 3 and 9. Early design estimates provided an innovative cost matrix to accurately predict project budgets and design project to stay within allocated budget. OPCs accurately predicted construction costs for both wellfield rehabilitation projects.

Principal Hydrogeologist/Project Hydrogeologist, Surficial Aquifer Wellfield Testing, Town of Jupiter, Florida (2008 - 2015). Hydrogeologic services includes the biannual testing of thirty-nine (39) surficial aquifer production wells for the Town of Jupiter to evaluate performance and water quality. JLA has provided these services for the Town since 2008, giving the client a long-term and comprehensive understanding of wellfield performance to better manage its resources.

Principal Hydrogeologist/Project Manager/Project Hydrogeologist, Lake Region Water Treatment Plant, Upper Floridan Aquifer Wellfield SFWMD Permitting Assistance, and Well Construction and Testing Services, Palm Beach County Water Utilities Department, Belle Glade, Florida (2012-2013). The Project included the well design, well installation construction observation and testing associated with the construction of one (1) new 14-inch diameter Upper Floridan aquifer well for the Lake Region WTP (2012). The Project included the development of a constant-density MODFLOW model with variable-density SEWAT code to obtain a SFWMD letter modification which predicted that additional UFA wells with increase spacing will reduce the rate of raw water salinity trends and decrease the rate of saline water upcoming (approved).

JANINE ALEXANDER, PE
FIELD SERVICES/INSPECTION WELLFIELD CONSTRUCTION MANAGEMENT

Ms. Alexander has more than 22 years of utility experience, including project management for the design of new facilities, relocations of existing facilities, utility coordination, permitting, construction administration, construction management, inspections, and certifications for numerous public and private-sector projects.

She has particular and extensive field engineering experience and working with contractors, shop drawings and resolving construction issues as they arise in the field. She has overseen the construction of many miles of pipe in Florida and most recently for the City of Hollywood, FL.

EXPERIENCE

Brackish Reverse Osmosis (RO) Water Treatment Plant No. 2, City Of Clearwater, Fl. Project Manager and Construction Manager for 6.25 MGD, $30 million (construction cost) brackish RO water treatment plant project. Responsible for day-to-day client and project team management and coordination for plant site, 17-offisite remote wells/wellfield and 64,625 feet of pipelines ranging from 3- to 22-inches in diameter. Managed overall project deliverables and budget, permitting (FDEP, ACOE, ERP, FDOT, and Pinellas County). Also served as the engineer or record and utility pipeline design leader for a total of 36,740 feet of piping including 8,020 feet 6-inch PVC; 14,680 feet of 8-inch PVC; and 3,190 feet of 12-inch PVC all installed via horizontal directional drill (25,880 feet PVC horizontal directional drill total with 433 feet subaqueous). Additional pipe includes 2,750 feet of 3-inch HDPE communication conduit, 860 feet 8-inch, 270 feet 10-inch, and 1,320 feet 14-inch DR-11 HDPE (5,200 feet HDPE horizontal directional drill total with 414 feet subaqueous). Project also includes 310 feet 6-inch PVC and 560 feet of 8-inch PVC, 130 feet of 8-inch dr-11 HDPE, 30 feet of 8-inch dip, and 4,530 feet of 12-inch dip piping installed via open cut. Construction manager role began in 2013 for four contracts including plant, wells and two pipeline contracts. Engineering design, permitting, and bidding cost was $3.58 million. Construction cost is $35 million for RO plant, well sites and pipelines.

Water Main Replacement Program: Hollywood Boulevard to Sheridan Street, North Dixie Highway to Federal Highway (US1), City of Hollywood, FL. Senior Project Manager for the design, permitting and construction administration services for the replacement of 100,000 feet of 2- through 16-inch diameter PVC and DIP water mains, fire hydrants, and water service lines, including relocation of existing meters for 157 lots in residential and commercial streets and alleyways. The project also includes three FEC railroad crossings at Polk Street, Johnson Street, and Taft Street. Pavement restoration, maintenance of traffic, and lane closure analyses were also included. Permitting includes Broward County right-of-way use for N. 21st Avenue, FEC railroad crossing permitting, FDOT utility permit for US1, DOH water system permit, and City of Hollywood Building Department permitting. Construction administration services include review of shop drawings, requests for additional information during construction, review and approval of change orders, field observations, obtaining clearances, substantial and final completion punch list preparation and record drawing preparation. This project is currently in 90% design.

EDUCATION

BS, Environmental Engineering, University of Central Florida, 1996

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #59244, Texas, #133420

Transportation Security Administration (TSA) Clearance

NPDES-Certified Inspector

NASSCO Pipeline Assessment Certification Program (PACP), Lateral Assessment Certification Program (LACP), and Manhole Assessment Certification Program (MACP) Certified, U-714-06021906

YEARS OF EXPERIENCE	30
YEARS WITH TETRA TECH	3

Water Main Replacement Program: Hollywood Boulevard to Sheridan Street, Federal Highway (US 1) to the Intracoastal Waterway, City of Hollywood, FL. Senior Project Manager for final design, permitting and construction administration services. The City of Hollywood (City) has an ongoing water main replacement program and has identified the area from Hollywood Boulevard to Sheridan Street between Federal Highway and the Intracoastal Waterway as a project for Tetra Tech to design under the General Engineering Consulting Services contract. The water main improvements consist of 99,700 feet of 2-through 16-inch diameter water mains along local City streets, rear easements and paved alleys. These improvements involve upgrading 2-inch, and 6-inch diameter water mains one nominal size and replacing 4-inch, 8-inch, 12-inch, and 16-inch diameter water mains with the same nominal size. The existing utilities will be replaced with new PVC or DIP water mains, fire hydrants, water services, and water meters (in some cases). Where water meter and boxes are located in rear easements, these will be relocated to the front within the City ROW. Permitting included FDOT Utility, DOH water system, and City of Hollywood Building Department permitting. Construction administration services include review of shop drawings, requests for additional information during construction, review and approval of change orders, field observations, obtaining clearances and substantial and final completion punch list preparation. Construction is currently at 90%.

Water Main Replacement Program: Pembroke Road to Hollywood Boulevard between N. 52 and N. 56 Avenues and State Road 441 (SR441), City of Hollywood, FL. Senior Project Manager for final design, permitting and construction administration services. The water main improvements consist of 70,000 feet of 2-through 16-inch diameter water mains along local City streets, rear easements and paved alleys. These improvements involve upgrading 2-inch, and 6-inch diameter water mains one nominal size and replacing 4-inch, 8-inch, 12-inch, and 16-inch diameter water mains with the same nominal size. The existing utilities will be replaced with new PVC or DIP water mains, fire hydrants, water services, and water meters (in some cases). Where water meter and boxes are located in rear easements, these will be relocated to the front within the City ROW. Permitting includes FDOT Utility, Broward County Health Department (BCHD) water system, and City of Hollywood Building Department permitting. Construction administration services include review of shop drawings, requests for additional information during construction, review and approval of change orders, field observations, obtaining clearances and substantial and final completion punch list preparation.

Southern Service Area Transmission Main Improvements, Orange County, FL. Project Manager for the construction administration phase of the project to improve potable water transmission capacity in the Southern Service Area region and to convey finished water from the South Regional Water Supply Facility (SRWSF). The project consisted of 2,000 feet of 16-inch DI water main; 3,610 feet of 36-inch DI water main; 4,135 feet of 42-inch DI water via open cut installation; 120 feet of 16-inch DI water main with 30-inch steel casing; and 175 feet of 36-inch DI water main with 54-inch steel casing installed via jack and bore under Orange Avenue and Crampton Drive, respectively. Horizontal directional drilling included 700 feet of 12-inch and 1,005 feet of 42-inch high-density polyethylene (HDPE) via horizontal directional drill under Town Center Boulevard; 770 feet of 42-inch HDPE via horizontal directional drill along Balcombe Road; and 1,175 feet of 42-inch HDPE via horizontal directional drill under Orange Blossom Trail. Appurtenances, gate and butterfly valves, ARVs and six new fire hydrants were also installed. Construction administration services included project management for shop drawing review and approvals, monthly progress meetings, requests for information (RFIs), review of contractor pay applications, change orders review, field directives, inspections, review of As-Builts, record drawing production and FDEP clearances and certifications. The project completed construction and record drawing submittals in June of 2016. Total construction cost was $6,408,626 for the transmission main improvements.

RODERICK K. CASHE, PE, CDT, LEED™ AP
CIVIL ENGINEERING

Mr. Cashe has served as a civil engineer since 1987. He is a Senior Project Manager with extensive experience serving both in the public and private sectors of civil and environmental engineering. He also serves as a Civil Engineering Discipline Leader for Tetra Tech's southeastern region and is responsible for staff in six offices in three states: Florida, Tennessee, and Kentucky.

As Discipline Lead for civil engineering, one of Mr. Cashe's most important roles is ensuring that our deliverables are thoroughly reviewed for quality control and quality assurance. Mr. Cashe has a diverse background in facilities engineering for federal and municipal projects ranging from troop housing and specialty officer complexes for the Department of Defense to HOPE VI multifamily housing for the Department of Housing and Urban Development and many public facilities including community centers, fire stations, parks, and public works facilities.

EXPERIENCE

Southeast Water Treatment Facility, Huntsville, AL. Construction Substantial Completion 2017. Quality Control and Quality Assurance of all civil/site engineering design for this new 24 MGD surface water treatment facility that has the capacity to expand to 96 MGD. The site improvements also include a raw water intake system and facilities to remove surface water from the Tennessee River.

7.0 MGD Lime Softening WTP, Bartow, FL. Lead Engineer for all civil/site engineering services to construct this water treatment facility. Services included design, permitting, and construction administration services. The permitting involved hydrologic and hydraulic (H&H) modeling to include compensating storage.

Estero Boulevard Water Main Improvements Phases 2-4, Town of Fort Myers Beach, FL. Quality Control. Design, permitting, and construction oversight for Segments 2-4. As part of the Fort Myers Beach reFRESH program, the Town of Fort Myers Beach (Town) and Lee County are providing water, sewer, and streetscape improvements along Estero Boulevard. Multiple joint outfalls were modeled, designed, and constructed to provide relief for runoff collected on Estero Boulevard. In total, more than 15 outfalls will provide a connection to Estero Bay to improve the nuisance flooding conditions within the County and Town right-of-way, increase water quality discharged into the Bay, and prevent tidal backflow into the streets.

Eastern Wastewater Treatment Facility, City of Deltona, FL. Project Manager for all engineering design, permitting, and construction administration services for this infrastructure to serve one of the City of Deltona's critical facilities. The permitting services involved floodplain mitigation along a riverine system; obtaining a FEMA Letter of Map Amendment (LOMA); and onsite wetland mitigation for unavoidable impacts to provide access to the City's new wastewater treatment facility. Construction completed in December 2013 for construction of the access road and creek crossing for the City's new wastewater treatment plant.

Duplex Pump Stations No. 3186 and No. 3213, Orange County Utilities, FL. QA/QC for demolition and rehab/reconstruction of 0.5 MGD and 0.4 MGD pump stations. Engineering services to perform hydraulic and structural design of pump stations and

EDUCATION

BS, Civil Engineering, University of Florida, 1987

Graduate Courses at the University of Central Florida

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #45169, Georgia, PE037524

National Construction Documents Technologist (CDT)

FDEP Qualified Stormwater Management Inspector, No. 5366

Green Building Certification Institute LEED AP

YEARS OF EXPERIENCE	32
YEARS WITH TETRA TECH	27

civil/site engineering for grading, drainage, and erosion control. Tetra Tech evaluated and designed improvements for two duplex pump stations. Both pump stations exceeded their useful lives and required replacement. The improvements associated with each pump station generally consisted of a wet well (replacement/rehabilitation), installation of two submersible pumps, SCADA system, electric control panel, standby generator with a base mounted fuel storage tank and site work. Tetra Tech's engineering services included survey, evaluation, design, permitting, land acquisition assistance, and construction management.

Miscellaneous Wastewater Civil Engineering Services, Various Clients and Sites, FL. Project engineer for various civil engineering assignments throughout Florida, including engineering services to perform hydraulic and structural design of pump stations and/or civil/site engineering for grading, drainage, and erosion control. Specific projects include:

- **Wastewater Duplex Pump Station, St. Johns County, FL.**
- **Wastewater/Reclaimed Booster Pump Station, St. Johns County, FL. Access drive and civil support 2x50 HP.**
- **Elkham Boulevard Wastewater Triplex Pump Station, City of Deltona, FL. Replacing and restoration civil support for 2 MGD pump station.**
- **Poinciana Wastewater Treatment Plant No. 5 Pump Stations and Pumping Facilities, Toho Water Authority, FL. 1 MGD.**
- **NW Master Wastewater Lift Station, St. Johns County, FL. . Relocation and civil site support for 1 MGD wastewater lift station.**
- **Alamo Rent a Car, Orlando International Airport (MCO), Orlando, FL. Demolition and erosion control for three pump stations.**

Cypress Avenue Water Transmission and Sewer Relocation Design/Build, City of Tampa, FL. Program Manager. Mr. Cashe lead a team of engineers with the professional engineering services for the construction of approximately two miles of 36-inch water transmission main and relocation of a 24-inch gravity sewer system. The design/build team had the challenge of constructing these utilities in conjunction with construction of a dual large-diameter box culvert conveyance system ranging in size from 10'x5' to dual 8'x8'. The gravity sewer system had to remain in service during construction.

Alexander Avenue Water Resources Facility, City of Deltona, FL. Client Manager. The City of Deltona is challenged with consumptive use permitting requirements from FDEP and the SJRWMD. To meet the need of their CUP, the City hired Tetra Tech to design a Water Resource Facility (WRF) that would be capable of treating stormwater pumped from a pond, a land-locked lake, and two stormwater pump stations (one planned for the future that would receive stormwater runoff from I-4 as part of the "Ultimate and Beyond" future widening project, and a future surface water withdrawal from the Lake Monroe. Mr. Cashe was project manager and Engineer of Record for the stormwater pump station and forcemain that conveys flow from the Leland Avenue DRA. The City's WRF is equipped with a water treatment system to remove TSS and grit, and provide disinfection system.

City of Cape Coral SW 6 and 7 Utility Expansion Program, Cape Coral, FL. Project Manager for all aspects of this $90,000,000 project involving the design, permitting, and construction management of 61 miles of roadway reconstruction necessary to install 8- to 12-inch gravity sewer, 6- to 16-inch potable watermain, 6- to 30-inch reuse water main, and associated drainage infrastructure requiring upsizing or replacement and renewal.

Eastern Wastewater Treatment Facility Reclaimed Watermain, Deltona, FL. Project Manager. Construction administration services for the construction of over four miles of 18-inch reclaimed watermain, in a constrained right-of-way, from the new Eastern Wastewater Treatment Facility to the City's Alexander Avenue Water Resources Facility.

JAMES CHRISTOPHER, PE, BCEE
WATER TREATMENT SPECIALIST

Mr. Christopher is a vice president and practice leader for drinking water treatment for Tetra Tech. His knowledge of water chemistry and water infrastructure design makes him highly qualified in defining, evaluating, and implementing water quality solutions to the most challenging problems. He has 37 years of professional engineering experience and is highly qualified in environmental engineering, with special expertise in water resources, water supply, water quality, reverse osmosis and nanofiltration, granular activated carbon, pumping system analysis/station design, facility planning, construction and administration, and overall project administration and coordination.

EXPERIENCE

McCarty Ranch Master Water Supply Plan, City of Port St. Lucie, FL. Project Manager. The project includes the creation of 20-year growth projections for the water, wastewater, and reclaimed water systems; determining future water supply needs over the planning period; evaluating the capacity of the existing sources of supply; updating the system hydraulic models; developing future water supply alternatives; and preparing a conceptual layout and cost estimate for the selected water supply alternative. A key water supply alternative to be evaluated is withdrawal of surface water from the C-23 canal for storage in a reservoir, treatment facility, and ASR facility proposed to be constructed on the 3900-acre McCarty Ranch site owned by the City. The project included the analysis of the increase in salinity in the JEA WTP well field and the recommendation for construction of 5 new supply wells.

Alternative Water Supply Design/Build, Tarpon Springs, FL. Design Manager for design and technical services associated with the design/build construction of the City's 6.4 MGD alternative water supply facility. The facility is designed to accommodate high salinity brackish water, 16,000 mg TDS/L, from a group of 15 Floridan aquifer supply wells and includes three 2.0 MGD reverse osmosis skids, degasification, biotrickling filters for odor control, chlorine contact, transfer pumping, 5 MG ground storage reservoir, and high-service pumping. Raw water system and reverse osmosis skids are designed using duplex stainless steel to accommodate high salinity and seawater membranes. Services included preparing the final design, services during construction, and facility startup and testing.

Central Water Integration Project (CWIP), San Antonio Water System, TX. Technical Advisor/Water Quality Lead. Project consists of treatment facilities, conveyance pipelines, and improvements to existing pump stations and distribution facilities to integrate a new 48.0 MGD potable water supply source into the utility's potable water distribution system. The supply source for this project consisted of a $900 million P3 water supply project that will import groundwater from a wellfield that is 140 miles from the City of San Antonio. Treatment facilities were designed to increase the calcium concentration, control the finished water pH, add fluoride and re-disinfect the water before being introduced into the existing transmission and distribution system.

Cypress Lake Water Treatment Plant, Toho Water Authority, Kissimmee, FL. Process Team Leader for the preparation of the conceptual and preliminary design reports, cost

EDUCATION

MS, Environmental Engineering and Science, University of Central Florida, 1980

BS, Chemistry, Duke University, 1976

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #34204, Georgia, #40943, Texas, #134780

YEARS OF EXPERIENCE	39
YEARS WITH TETRA TECH	29

budgets, and schedules for a proposed 34.0 MGD regional reverse osmosis water treatment supply facility, raw water supply well field, and deep injection well disposal system. This preliminary design included the new well field which will require construction and equipping of new Floridan Aquifer supply wells.

Groundwater Replenishment (GWR) Feasibility Study and Advanced Pilot Plant Demonstration, City of Clearwater, FL. Technical Leader responsible for oversight of the development of the preliminary process layout and cost estimates for a 3.0 MGD treatment system to convert reclaimed water from the Northwest wastewater treatment plant to suitable quality for injection into the potable water aquifer to supplement the drinking water supply. The project will treat reclaimed water to greater than potable water standards and inject it into Zone B of the upper Floridan Aquifer using three injection wells to recharge a portion of the City's well field.

Shell Creek Water Treatment Plant Reverse Osmosis Addition, City of Punta Gorda, FL. Technical Leader responsible for supervision and oversight of the addition of a 4.0 MGD expandable to 8.0 MGD reverse osmosis treatment plant to supplement the existing 10.0 MGD surface water source and treatment facility to meet the secondary standard for total dissolved solids and to remediate arsenic in the existing aquifer storage and recovery wells. The project includes the construction and equipping of four new water supply wells and the modification and equipping of two aquifer storage and recovery wells as production wells.

James E. Anderson Water Treatment Plant Expansion, City of Port St. Lucie, FL. Engineer of Record. Project included the construction of seven Floridan aquifer supply wells, one blend well, and the addition of seven 2.0 MGD reverse osmosis skids, addition of feed and blend micron filters, expansion of the chemical feed system, and expansion of the degasification and odor control facilities to increase the capacity in three construction milestones from 6.0 to 22.0 MGD. Responsible for the location, sanitary surveys, construction and equipping of eight new Floridan Aquifer supply wells.

South Regional Reverse Osmosis Water Treatment Plant, City of Palm Bay, FL. Program Manager for the conceptual layout, cost estimating, exploratory well program, and preliminary and final design for the construction of a new 4.0 MGD expandable to 10.0 MGD reverse osmosis facility to treat brackish water from the upper Floridan Aquifer. The project included the construction of an exploratory well to 2300 feet and the location and construction of three new water production wells.

Water Expansion Program, City of North Miami Beach, FL. Program Manager. The water program was initiated so the City could become independent of Miami-Dade Water and Sewer Department as a source of finished water to serve its customers. The program included the expansion of the construction and equipping of five new Biscayne Aquifer supply wells, construction and equipping of four new Floridan Aquifer brackish water supply wells, construction of a deep injection well, increasing the City's water use permit from 17.67 to 41.0 MGD, and the construction of a new membrane treatment facility at the site of the existing Norwood-Oeffler WTP. The new membrane facilities included pretreatment systems, three 3.0 MGD nanofiltration skids, three 2.0 MGD reverse osmosis skids, post treatment facilities, storage, high service pumping, and a new operations building and laboratory.

Prineville Reverse Osmosis Water Treatment Plant, City of Port St. Lucie, FL. Project Manager. The project included an exploratory Floridan aquifer well program, construction of three Floridan aquifer supply wells, water use permitting, construction of a new 4.0 MGD reverse osmosis treatment facility expandable to 10.0 MGD on the site of the City's existing 6.85 MGD lime softening water treatment plant, integration of the facilities, blending of the finished waters, a new utilities administration building, and concentrate disposal via deep well injection at the Northport wastewater treatment plant. Responsible for providing project management, design, and professional services for every aspect of the project from inception through startup of the new facilities.

1.5 MGD Troutman Boulevard Reverse Osmosis Water Treatment Plant, City of Palm Bay, FL. Project Manager for evaluation of the used reverse osmosis equipment procurement and design and permitting of the two new Floridan aquifer supply wells and concentrate disposal force main discharging the concentrate to the head of the Port Malabar wastewater treatment plant.

7.0 MGD Lime Softening Water Treatment Plant, City of Bartow, FL. Senior Project Manager for the process design, raw water supply, site layout, and design oversight for the new lime softening plant.

Corkscrew Lime Softening Water Treatment Plant Expansion, Lee County, FL. Project Manager responsible for preliminary and final design, permitting, and construction administration services for the expansion of the existing 10.0 MGD lime softening plant to 15.0 MGD. The project included the design of a new aerator, lime silo and slaker, solids contact unit, recarbonation basin, dual media filters, and the expansion of chemical feed, transfer pumping, and sludge lagoon systems.

DOUGLAS DUFRESNE, PG
HYDROGEOLOGIC INVESTIGATIONS
ARDAMAN & ASSOCIATES, INC. (A TETRA TECH COMPANY)

Mr. Dufresne, with Ardaman & Associates, Inc., has provided professional geological and hydrogeological services to municipalities, water and wastewater utilities, engineering companies, and private industry for 30 years. Services he provided include geological and hydrogeological studies, groundwater flow modeling, contaminant transport modeling, groundwater monitoring, water resource assessment, water use permitting, well and wellfield design, well construction services, aquifer performance testing, alternative water supply planning, aquifer storage and recovery, deep injection wells, environmental site assessments, and expert witness services. He has presented and published nearly 40 technical papers at several regional, national, and international conferences on various hydrogeological topics.

EXPERIENCE

Exploratory Well Test Program for RO Water Treatment Facility, City of Port St. Lucie, FL. Mr. Dufresne was the project hydrogeologist for the project, which included the design, bidding, and construction observation of two Floridan aquifer wells. The exploratory well was constructed with 600 feet of well casing and 1,250 feet of open hole for a total depth of 1850 feet. Next the test/production well was constructed with 650 feet of casing and 700 feet of open hole for a total depth of 1350 feet. Both wells went through testing including video logging, geophysical logging, step-drawdown testing, water quality testing, and a 72-hour aquifer performance test.

James E. Anderson Wellfield Expansion, City of Port St. Lucie, FL. Mr. Dufresne was senior project manager for the project with a construction cost of $3.73 million, which included groundwater modeling, water use permitting, preliminary design, production well and blend well design, bidding and award, field construction services, permitting, construction management, and testing. The wellfield expansion included seven (7) deep Floridan aquifer production wells each with a capacity of 1,800 gpm and one (1) deep Floridan aquifer blend well with a capacity of 1,000 gpm, with a total wellfield capacity of 19.6 MGD.

Norwood-Oeffler WTP Raw Water Supply Wells, City of North Miami Beach, FL. Mr. Dufresne was senior hydrogeologist and project manager for the project with a construction cost of $1.66 million, which included the expansion of the Biscayne aquifer wellfield and Floridan aquifer wellfield. Tasks included groundwater modeling, production well design, field construction services, permitting, construction management, and testing. The wellfield expansion included five (5) Biscayne aquifer production wells each with a total depth of less than 100 feet and capacity of 2,800 gpm and two (2) deep Floridan aquifer wells each with a total depth of 1,250 feet and capacity of 1,700 gpm, with an overall capacity of 25 MGD.

Southwest Wellfield Program, City of Port St. Lucie, FL. Mr. Dufresne was senior project manager for the project with a construction cost of $850,000, which included wellfield location services, well services, preparation and simulation of a regional groundwater flow model, and the modification of the City's water use permit. A 72-hour constant rate discharge test was performed to determine the wellfield hydrogeologic parameters for an 11-county regional groundwater flow model to increase the allocation of the City's water use permit.

EDUCATION

MS, Geology, University of Florida, 1988

BS, Earth Sciences, University of New Orleans, 1984

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #1527

Registered Geologist, Georgia, #2008

Professional Geoscientist, Louisiana, #699

YEARS OF EXPERIENCE	30
YEARS WITH TETRA TECH	8

Alternative Water Supply Study, City of Port St. Lucie, FL. Mr. Dufresne was the project manager for the project, which included a safe yield of the surficial aquifer and whether it could provide the raw water capacity for near-term demands, identification of potential areas within the City service area for future raw water supply development, and an evaluation of other sources of water such as the Floridan aquifer and surface water. The quantity and quality of water from all sources investigated were analyzed along with the potential for adverse impacts. The study also involved construction of a detailed groundwater flow model in order to determine potential impacts to wetlands and existing legal-users for potential wellfield expansion.

Exploratory Well Program, City of Palm Bay, FL. Provided hydrogeological services to the City of Palm Bay related to the Exploratory Well Program. Mr. Dufresne, project manager, provided the necessary professional services for the construction of exploratory, test/production and monitoring wells for the reverse osmosis water treatment plant to be located on the South Regional Water Treatment Facility site.

South Regional Deep Injection Well Permitting and Construction Management, City of Palm Bay, FL. Mr. Dufresne was project manager and he provided hydrogeological services to the City of Palm Bay for the deep injection well permitting and construction management for the South Regional RO Water Treatment Plant.

Water Use Permit Renewal, City of Palm Bay, FL. Mr. Dufresne provided hydrogeological services for the City of Palm Bay's consumptive use permit renewal. The groundwater flow model constructed for the renewal was used to show there would be no adverse conditions to Floridan aquifer withdrawals or surficial aquifer withdrawals. The City was issued a 20-year permit from the St. Johns River Water Management District.

Groundwater Resources Development Study, City of Palm Bay, FL. Mr. Dufresne provided hydrogeological services for the City of Palm Bay for water supply planning to evaluate the existing surficial aquifer as a primary water source for the Palm Bay Utility Corporation and to evaluate the potential use of the Floridan aquifer for a future water supply in conjunction with a reverse osmosis water treatment plant.

Well Condition Survey, Toho Water Authority. Ardaman prepared a well condition survey for the Toho Water Authority which included data collection and analysis of their 35 active potable water supply wells. This evaluation included the gathering of existing information on the wells and analysis of the data gathered in order to aid Toho in the prioritization of well rehabilitation or replacement efforts in the future. Ardaman requested from Toho all pertinent well data which may be obtained from well completion reports, well construction summary reports, maintenance records, water use permit information, and other technical well reports. Particular data analyses included well age, well production, static and pumping water levels, pump rates, specific capacity, well efficiency, and well problems.

Cooling Wells System and Ground Water Study, Baha Mar, Nassau, Bahamas. Senior project manager for the cooling wells system project with a construction cost of over $5 million, which included preliminary design, production well and injection well design, field construction services, permitting, construction management, and testing. Once test wells were constructed and tested, a groundwater flow model was constructed to simulate the potential impact of the cooling well system in operation with 47.5 MGD of cool seawater withdrawn from the production zone and warmed return seawater injected into the disposal zone. A ground water study was also conducted to assist in the development of the resort stormwater management system.

Wellfield Expansion and Water Use Permitting, City of Bartow, FL. Mr. Dufresne was the project manager for the wellfield expansion and water use permitting. These services included the selection of wellfield site; the design, bidding, and construction supervision of four Floridan aquifer production wells along with associated piping, vertical turbine pumps, electrical, controls, and housing. The test/production well was thoroughly developed to produce the necessary water efficiently and at a higher quality. The results of the well testing were used to modify the City's water use permit with the Southwest Florida Water Management District (SWFWMD). A three-dimensional groundwater flow model was used as part of the supporting documentation to the SWFWMD. The model indicated that there were no adverse impacts to the environment or existing legal users with the proposed withdrawals and the City received their water use permit.

KEVIN FRIEDMAN, PE
WELLHEAD FACILITIES SPECIALIST

Mr. Friedman specializes in environmental engineering projects throughout central Florida. His expertise includes the design, permitting, and construction administration of water, wastewater, and reclaimed water facilities and infrastructure. His wide range of experience includes water and wastewater treatment facilities, residuals processing, wastewater collection, pump stations, transmission mains, water supply, and utility master planning.

EXPERIENCE

Harmony Well No. 2R and Bay Lake Estates Well 2, Toho Water Authority, FL. Project Manager. Provide professional engineering for final design, permitting and construction phase services for the installation of a new vertical turbine well pump and connection to the existing raw water main for the Harmony and Bay Lake Estates WTPs. Modifications included the installation of a fenced enclosure and connection to the existing control panels and discharge piping.

North Bermuda Well No. 4 & Northwest Well No. 1 and No. 2 Standby Power Generator Upgrades, Toho Water Authority, FL. Project Manager. Provide professional engineering services associated with final design, permitting, bidding, and construction administration to construct a new standby power system to include a generator and bulk fuel storage tank at North Bermuda Well No. 4 and replace the existing generator at Northwest Well Nos. 1 and 2 to sustain raw water supply capacity during periods of power failure.

Markham Regional Water Treatment Plant Upgrades, Seminole County, FL. Project Engineer for design, permitting, and construction of an expansion and upgrade of the existing Markham WTP. Upgrades included ozonation for hydrogen sulfide oxidation and ion exchange for reducing total organic carbon. Pilot testing was performed to develop design criteria for the ozone and ion exchange systems. The expansion also included a new 1.5 mg storage tank, new chlorine and fluoride storage and feed systems, a 54-inch diameter pipe for chlorine contact, additional high service pumps, and standby electrical generators to provide capacity for treating 17.28 mgd. The project also included provisions for adding surface water blending at Markham Regional WTP and a new Operations Building designed to meet the Florida Green Building Coalition certification standards.

Polk Power Station Reclaimed Water Treatment Plant, Tampa Electric Company (TECO), Mulberry, FL. Project Engineer. Provided preliminary and final design, and procurement services for a 5.7 MGD water treatment plant, expandable to 17 MGD. Treatment includes coagulation, media filtration, and salinity reduction using reverse osmosis. A wetland treatment system receiving waste water effluent serves as the source of supply. Product water will be delivered to a power facility cooling reservoir for salinity control. The facility serves as an alternative water supply to reduce groundwater withdrawals as mandated by the water management district.

Southwest Water Treatment Plant Ozone Treatment System, Tohopekaliga Water Authority, Kissimmee, FL. Project Engineer responsible for design, project team coordination, construction administration, and management of engineering services for this ozone treatment system project to reduce the H2S concentration in the raw water

EDUCATION

BS, Environmental Engineering Sciences, University of Florida, 2003

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #69852

YEARS OF EXPERIENCE	16
YEARS WITH TETRA TECH	4

from the two new Intercession City wells prior to entering the ground storage tank at the Southwest Water Treatment Plant.

Northwest WRF Expansion Design-Build, Hillsborough County, FL. Project Manager. Improvements include all of the requisite facilities necessary to increase the permitted capacity from 10.0 MGD to 30.0 MGD on an AADF basis. The proposed expansion of the NWRWRF include a neew headworks (screening and degritting), inline flow equalization and influent flow distribution box; retrofit of existing biological nutrient removal (BNR) basins to enhance nitrogen removal and additional 5-stage BNR treatment trains; additional odor control systems; additional clarifier flow splitter box and additional secondary clarifiers; new sodium hypochlorite storage tanks and associated chemical feed pumps; additional RAS pump station; additional deep bed filters; additional chlorine contact basins; additional effluent transfer pumps and new reclaimed water pumps; additional pre-stressed concrete reclaimed water storage tanks; new power feed to the site and additional standby power facilities; and electrical and instrumentation improvements.

Cypress West WRF Upgrade, Toho Water Authority, FL. Project Engineer. Upgrade and expansion of an existing 3.0 MGD SBR facility to provide a capacity of 6.0 MGD via implementation of the MLE process with conventional settling, filtration, and disinfection unit operations. Expand the plant capacity to 6.00 MGD via construction of filtration, chlorine contact, effluent storage, and reclaimed water pumping improvements.

Conserv II WRF Filter Study, City of Orlando, FL. Project Engineer. The City's Water Conserv II Water Reclamation Facility (WRF) has a permitted design capacity of 21 MGD on an annual average daily flow (AADF) basis. The City planned to replace the traveling bridge sand filters with deep bed sand filters. Identify acceptable approaches to address the challenges associated with this concept (space constraints, hydraulic profile considerations, maintenance of treatment during construction, and potential presence of soils unsuitable for support of the proposed structures) and to establish a capital budget for implementation of the proposed improvements.

Conserv I WRF RIB Modifications, City of Orlando, FL. Project Engineer. Removal of specific lateral flow percolation ponds at the Water Conserv I WRF for the future construction of light rail and related support facilities. Modify the reuse delivery system and modify the existing plant piping to allow the removal of the lateral flow percolation ponds required and still meet the FDEP criteria. Design of an overflow erosion protection system to be located at the existing storage tank overflow structure to serve as an emergency spillway into the adjacent wetland system.

Parkway WRF Clarifier No. 2 Rehabilitation, Toho Water Authority, FL. Project Manager. Professional engineering services for the design and construction of a replacement sludge collection mechanism for Clarifier No. 2 and minor structural repairs to address cracking, spalling or other issues.

160 Acre Site RIB Valve and Flow Meter Automation Rehabilitation, Toho Water Authority, FL. Project Manager. Professional engineering services for design and construction to automate operation of the remote RIB valve/meter assemblies at the 160-acre Rapid Infiltration Basin (RIB) sites.

Iron Bridge Regional Water Reclamation Facility, City of Orlando, FL. Deputy Project Manager responsible for design, project team coordination, construction administration, and management of engineering services for constructing a new 37.5 MGD pump station, new aluminum covers for the deep bed filters and south chlorine contact basin, a new electrical building and improvements at the existing wetlands transmission main and eastern regional reclaimed water distribution system interconnect.

South Bermuda Water Reclamation Facility Clarifier Mechanism Replacement, Tohopekaliga Water Authority, Kissimmee, FL. Technical Lead (90% submittal through construction) assisting in final design and construction phase services of new clarifier mechanisms at the facility. The existing draft tube type sludge collection mechanisms were converted to spiral scraper type sludge mechanisms using proprietary collection manifold device. The purpose of this project was to replace the 26 year old clarifier equipment with new more efficient equipment while minimizing the amount of construction efforts required.

AOAO Process Diffuser Replacement, Tohopekaliga Water Authority, Kissimmee, FL. Technical Lead for construction phase services for the replacement of the existing diffusers in Toho Water Authority's AOAO process at the South Bermuda WRF.

South Bermuda Water Reclamation Facility Central Electrical Building, Tohopekaliga Water Authority, Kissimmee, FL. Technical Lead assisting in design of a new central electrical building to consolidate individual services at the facility. The electrical building houses two 1750 kW generators and ancillary electrical equipment with space for a third generator. Fuel storage is located adjacent to the building in above ground vaulted containment-type tanks. The consolidation of power is expected to lower O&M costs by having centralized emergency power and redundancy in generators.

Northeast Regional Wastewater Treatment Facility Expansion, Polk County Utilities, FL. Project Engineer. Provided preliminary design, final design, procurement, and construction phase services for the expansion of the facility from 3.0 MGD to 6.0 MGD. Project includes the following major unit processes: preliminary treatment, flow equalization, anoxic/aeration, secondary clarification, RAS/WAS pumping, tertiary filtration, chlorine contact, effluent transfer pumping, biosolids storage/stabilization, chemical systems, reuse storage/pumping, reuse augmentation well, electrical upgrade, and instrumentation and controls including BNR system automation. Responsibilities included design of BNR, tertiary filters, and biosolids storage and stabilization. Also provided support during construction.

JON FRIEDRICHS, PG
FIELD SERVICES/INSPECTION WELLFIELD CONSTRUCTION MANAGEMENT, JLA GEOSCIENCES, INC.,

Mr. Friedrichs, is a Senior Hydrogeologist at JLA Geosciences, with over 13 years' experience providing well construction project management, technical oversight, well design and construction phase services. He has extensive experience in the construction of wells suitable for nanofiltratration (NF) and reverse osmosis (RO) feed water supply. His experience includes hydrogeologic investigations, drilling data acquisition, aquifer profiling, geophysical borehole log interpretation, aquifer performance testing, groundwater and surface water quality sampling. Mr. Friedrichs oversees multiple well rehabilitation contracts for public water supply well rehabilitation projects, manages construction progress, rehabilitation methods, designs rehab scopes of work for surficial and Floridan aquifer production wells, and is a technical problem solver of unique well conditions. Mr. Friedrichs is an expert in the design and implementation of rock coring programs, evaluation of specialized geophysical logging techniques to identify limestone aquifer flow zones and specific completion depth monitor well construction within high permeability flow zones for long term monitoring of groundwater(s) of widely varying densities. Since 2005, has been involved as a primary field geologist on numerous Floridan Aquifer and Surficial Aquifer Water Supply wells, and Aquifer Performance Tests throughout Central and South Florida.

EXPERIENCE

Senior Hydrogeologist/Project Manager, Floridan Aquifer Production Well 5, Seacoast Utility Authority, Palm Beach Gardens, FL. Oversaw construction of Upper Floridan Aquifer (UFA) Production Well F-5 to supplement the existing reverse osmosis raw water supply for the SUA, Hood Road Water Treatment Plant (HRWTP). JLA's scope of services included well design, construction observation, lithologic and water quality sampling, geophysical logging observation and analysis, well development observation and testing, and pump testing. UFA well F-5 was constructed to reduce demand and help minimize water quality degradation of the existing SUA FAS wellfield wells over time.

Senior Hydrogeologist/Project Manager, ASR Permitting, Testing Services, The City of West Palm Beach, West Palm Beach, FL. (2009-2013, ongoing) Project scope of services included assisting the City in obtaining funding opportunities with cycle testing activities through various entities, assistance with obtaining FDEP Underground Injection Control (UIC) permit modification, UIC monitor well design, permitting, construction and bidding phase services, exploration of Limited Aquifer Exemption assistance through FDEP, ASR Cycle Testing assistance, and evaluation of the City's recovery discharge alternatives.

Senior Hydrogeologist/Project, Surficial Aquifer Replacement Well Program, Seacoast Utility Authority, Palm Beach Gardens, FL. Oversaw rehabilitation and replacement of 26 Surficial Aquifer Production wells throughout their four (4) Surficial aquifer wellfields. This multi-phase project has included replacing underperforming wells; renewed and reconstructed existing wells with proven performance and/or space limitations; maximized use of existing surface equipment; and utilized specialized drilling equipment to effectively rehabilitate each well based on site specific conditions.

Senior Hydrogeologist/Project Manager, Surficial Aquifer Rehabilitation of PBG-8, Seacoast Utility Authority, Palm Beach Gardens, FL. Oversaw reconstruction of one (1) Surficial aquifer production well, PBG-8. Production Well PBG-8 was reconstructed due to a collapsed well screen and hole in the 12-inch diameter steel casing. The reconstructed production well will supply the new SUA, nano-filtration membrane water treatment plant at the Hood Road Water Treatment Plant site (HRWTP), located in Palm Beach Gardens, Florida. Well PBG-8 was historically a high capacity well, but was located immediately adjacent to a surface water body and a residential housing complex and would not have been re-permitted due to current well setback criteria. Developed a

EDUCATION

MS, Geology, East Carolina University, 2005

BS, Environmental Geology; College of William and Mary, 2001

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida #2709

YEARS OF EXPERIENCE	13
YEARS WITH JLA	13

project approach which allowed the well to be re-constructed in the existing borehole, bypassing permitting restrictions.

Senior Hydrogeologist/Project Manager, Mechanical Integrity Testing for Two Class I Injection Wells, Seacoast Utility Authority, Palm Beach Gardens, FL. Performed planning, construction, testing and reporting of mechanical integrity testing of two (2) Class I injection wells. The MIT testing included wells IW-1 at PGA WWTP and HRIW-1 at the Hood Road WTP. Services included the following: Preparation of two (2) MIT plans for submittal to FDEP and TAC; Review of technical specifications and contract documents; field services during MIT; preparation and submittal of two MIT reports summarizing testing results and operating data. Analysis of the PBG WWTP DZMW-1data indicated water quality freshening and artesian pressure increasing in the lower monitoring zone (LMZ) well starting in April, 2014 indicating the LMZ and upper monitoring zone (UMZ) were connected. Generated and submitted a plan to DEP seeking authorization for a downhole investigation of the DZMW-1, LMZ casing that included Fluid Conductivity-Temperature (FCT) Logging, water quality sampling, and downhole video logging. The DZMW-1 investigation plan was approved by DEP on March 17, 2015 and the work was completed on March 19, 2015 by the Florida licensed drilling contractor. The investigation concluded that there were multiple breaches in the DZMW-1 LMZ casing and SUA began the process of replacing DZMW-1 in its entirety.

ROSSY GUIMA
LABORATORY & ENVIRONMENTAL, PACE ANALYTICAL

Ms. Guima has been in the Environmental Laboratory field since April of 2007. Ms. Guima serves as Project Manager for the City of Pompano Beach. As Project Manager her main role is to serve as liaison between laboratory personnel and client to ensure effective project management, ensuring the laboratory is meeting customers turn around time and their project specifications, including reporting limits and QA/AC requirements.

EXPERIENCE

Responsible for the coordination and tracking of tasks, schedules, and deliverables for projects related to environmental analysis, compliance, permitting, remediation, etc.

- **Generate & review reports, invoices & deliverables prepared by team before submitting to client**
- **Responsible for preparation and submittal of specified reporting formats, such as EDDs, ADaPT, Drinking Water Forms, etc.**
- **Ensure reports are complete, current, and properly stored**
- **Serve as point of contact between clients and laboratory**
- **Address customers concerns**
- **Effectively enforce project standards**
- **Minimize risks on projects**
- **Manage day-to-day client interaction**
- **Develop lasting relationships with client personnel that foster client ties**

EDUCATION

Bachelor in Supply Management and Logistics, Broward College, 2015

AS, Business Administration, Broward College, 2013

REGISTRATIONS/ CERTIFICATIONS

Management and Strategy Institute- Lean Six Sigma White Belt Certified (LSSWB)

Management and Strategy Institute- Project Management Essentials Certified (PMEC)

YEARS OF EXPERIENCE	12
YEARS WITH PACE	8

LAURA KUEBLER, PE
GROUNDWATER FLOW/TRANSPORT MODELING
JLA GEOSCIENCES, INC.

Ms. Kuebler is a water resource and hydrologic modeling consultant with 18 years of professional experience. As a consultant, Ms. Kuebler has provided technical and modeling support for regulatory groundwater impact analyses using analytical and numerical models for the Lower East Coast, Lower West Coast and Lower Kissimmee Basin regions of Florida, the Project Delivery Team for the Loxahatchee River Watershed Restoration Plan (LRWRP) of the Comprehensive Everglades Restoration Plan (CERP), and the Millennium Challenge Corporation's (MCC) Mongolia Compact. Prior to consulting, for almost 15 years, she served as a hydrogeologist and hydrologic modeler at the South Florida Water Management District supporting major program areas, including Water Supply Planning, Water Use Regulation, Everglades Restoration, Operations/Engineering and the Executive Office. Ms. Kuebler has applied SFWMD surficial aquifer system (SAS) and Floridan aquifer system (FAS) MODFLOW and SEAWAT models for subregional and regional projects and is experienced in leading teams for ecosystem restoration and water supply planning projects, including working with multi-agency and multi-disciplinary teams. She is a primary developer of the SFWMD LECSR Model, which is a combination and refinement of predecessor county-wide models of the SAS covering 7,500 square miles from Martin to Miami-Dade counties, and has applied LECSR to support multiple program areas (e.g., water supply planning, water use regulation, water shortages, engineering and initial design). She led and contributed to several regional groundwater studies, including a SFWMD-wide assessment of hydrogeologic properties, boundaries and monitoring locations used in SFWMD-developed groundwater models, a SFWMD-wide pilot study of groundwater-level monitoring network design for the Upper Floridan aquifer, a hydrogeologic unit mapping update for the LWC Water Supply Planning Area, as well as preparation of agency-wide 2011 Water Shortage Situation Reports and Incident Action Plans.

EXPERIENCE

Water Resources and Hydrologic Modeling Consultant, May 2018 to present.

Independent Consultant. Advisory and due diligence services for the Millennium Challenge Corporation's (MCC) Mongolia Second Compact. Perform model review of MODFLOW groundwater models and provide technical support for a Feasibility Study to evaluate proposed bulk water supply alternatives. Subcontractor to Hazen and Sawyer.

Groundwater modeling in compliance with South Florida Water Management District (SFWMD) regulatory criteria. Applied MODFLOW groundwater model to evaluate proposed public water supply withdrawals in the surficial aquifer system. Groundwater impact analyses for the Village of Wellington, FL. Subcontractor to JLA Geosciences.

Senior Hydrogeologist, October 2016 to April 2018. Grandusky, Lamb and Associates. Broward County groundwater modeling in compliance with SFWMD regulatory criteria. Applied MODFLOW groundwater model to evaluate proposed public water supply withdrawals in the Biscayne aquifer. Groundwater impact analyses provided for Broward County Water Management Division Water and Wastewater Services, FL (for South Regional Wellfield) and for the City of Hallandale, FL.

City of Stuart Alternative Water Supply (AWS) groundwater modeling. Applied East Coast Floridan Model (ECFM) – a SEAWAT density-driven flow and transport groundwater

EDUCATION

MS in Geology, Hydrogeology specialization. Florida Atlantic University, Boca Raton, FL

BS in Environmental Studies, Environmental Policy specialization, University of West Florida, Pensacola, FL

Certified Professional Coach (CPC), Professional Coaching, Institute for Professional Excellence in Coaching (IPEC)

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #62561

YEARS OF EXPERIENCE	19
YEARS WITH JLA	<1

model developed by the SFWMD - to evaluate potential public water supply withdrawals in the Floridan aquifer system (FAS) and evaluate changes in potentiometric levels and water quality.

Lower East Coast (LEC), Lower West Coast (LWC) and Lower Kissimmee Basin groundwater modeling basic analytic impact assessments. Applied WINFLOW analytical model and MODFLOW groundwater model to evaluate proposed agricultural and dewatering withdrawals in the surficial aquifer system, intermediate aquifer system and Floridan aquifer system for various consumptive use permittees.

Advisory services for the Millennium Challenge Corporation's (MCC) Mongolia Second Compact. Performed model refinement and applied MODFLOW groundwater models for a Viability Assessment to evaluate proposed bulk water supply alternatives, including additional groundwater extraction and artificial aquifer recharge (AAR).

Project Delivery Team (PDT) technical support for the Loxahatchee River Watershed Restoration Plan (LRWRP) of the Comprehensive Everglades Restoration Plan (CERP). Served on the PDT and Modeling Subteams focusing on model development and application review.

Hydrogeologist to Senior Hydrologic Modeler, January 2002 to September 2016. South Florida Water Management District (SFWMD), Water Supply and Hydrologic and Environmental Systems Modeling (HESM) Departments/Bureaus. Provided numerical modeling, technical and project management support for major program areas at the SFWMD, including Water Supply Planning, Water Use Regulation, Everglades Restoration, Operations/Engineering and Executive Office. Served as a team member of the Subregional/Groundwater Modeling Unit developing and applying MODFLOW/SEAWAT models for the surficial aquifer system (SAS), intermediate aquifer system (IAS) and Floridan aquifer system (FAS), including the LEC Subregional MODFLOW Model (LECSR), LWC Surficial and Intermediate Aquifer System Model (LWCSIM), LWC FAS Model and ECFM.

Led modeling activities as SFWMD Modeling Subteam Chair and performed modeling evaluations supporting CERP LRWRP and Restoration Strategies Mecca Replacement Project with cross-department and agency resources. Developed and applied a hydrologic model to evaluate sets of alternatives for various project phases. Regional stage and flow boundary conditions were derived from a regional model SFWMM for LECSR-NP - a MODFLOW-based model utilizing several add-on packages to simulate wetland systems and canals, water deliveries (or diversions) and water restrictions, in addition to groundwater flow. Pre-processing of certain water budget components was done using a modified version of the Agricultural Field Scale Irrigation Requirements Simulation Model (AFSIRS), which generated surface runoff, groundwater recharge, ET and irrigation demands.

Supported various hydrologic modeling phases (planning/initial design) of CERP/Acceler8/Water Preserve Area (WPA) projects, including Strazzulla Wetlands, Site 1, C-9 and C-11 Impoundments and C-111 Spreader Swale with SFWMD models (LECSR, Broward and South Palm Beach county-wide models). Supported Minimum Flow and Level (MFL) modeling evaluations for Loxahatchee River and Biscayne Bay with LECSR.

Responsible for preparation of agency-wide 2011 Water Shortage Situation Reports and Incident Action Plans; performed water level and water quality analysis for several utilities of concern (Deerfield Beach, Dania Beach, Ft. Lauderdale, Hollywood, Pompano Beach, Sunrise) for the 2007 and 2011 Water Shortage Groundwater Conditions Team, as well as assisting with two Emergency Orders for Dania Beach and providing modeling support for a WCA deviation request.

Provided regulatory support to the CUPcon Agricultural Irrigation Water Demand Modeling Subgroup, modeling support for wetland evaluation for Town of Jupiter permit renewal, and technical and modeling support for developing canal-aquifer budget calibration criteria for the Regional Water Availability Rule for Miami-Dade Water and Sewer Department permit renewal.

Led/contributed to SFWMD regional investigations - Groundwater Data Subteam assessment of hydrogeologic properties, boundaries and monitoring locations used in SFWMD-developed groundwater models; pilot study of groundwater-level monitoring network design for the Upper Floridan aquifer; hydrogeologic unit mapping update for the LWC Water Supply Planning Area; Technical Working Group publication for model implementation and application protocols for technically defensible modeling.

W. BRUCE LAFRENZ, PG
GROUNDWATER FLOW/TRANSPORT MODELING

Mr. Lafrenz has managed and executed numerous studies of groundwater resource development, testing, protection, simulation, permitting, and monitoring. He has particular expertise in computer modeling of groundwater related problems and in developing computer applications for hydrogeologic investigations into the surficial aquifer and Floridan aquifer systems for the development of new wellfields and expansion of existing wellfields. The investigations include design and implementation of exploratory well and testing programs, aquifer performance testing and analysis, and geophysical logging. Using those data and regional data he has constructed groundwater flow models used to design the wellfields. Mr. Lafrenz has been qualified and has testified in administrative hearings and courts of law as an expert in: geology; hydrogeology; well and wellfield siting and design; aquifer performance test design, implementation and analysis; water use permitting and regulation; groundwater flow and transport modeling; water use impacts mitigation; contamination assessment and cost-to-correct estimation; and mineral resource assessment.

EXPERIENCE

Shell Creek Water Treatment Plant RO Supply Hydrogeologic Investigation and Deep Injection Well, Punta Gorda, FL. Served as technical lead for project to test and design a new wellfield to produce 10 MGD of potable water using RO treatment of Floridan aquifer groundwater. Existing ASR wells were converted to groundwater supply wells and new test/supply wells were also added as part of this project. By-products of RO treatment will be disposed of in a Class I deep injection well (DIW). Project comprised design of Floridan aquifer production wells and Floridan/intermediate/surficial observation wells, well and aquifer testing plan design and execution, geophysical logging, flow zone characterization, MODFLOW simulations to estimate Floridan aquifer impacts close-out of the project to construct a 3,250 feet deep DIW and 2,450 feet deep dual-zone monitoring well.

Polk County (Florida) Utilities, Wellfield Planning and Optimization, FL. Polk County Utilities water system consists of several unconnected utility service areas. Using the Southwest Florida Water Management District (SWFWMD) model, DWRMv2.1, he evaluated optimization scenarios for one utility service area wherein pumping to satisfy projected demands was distributed among existing and proposed wells and wellfields.

City of Everglades City, Public Water Supply Well in the Gray Limestone Aquifer, FL. Assisted project by analyzing lithologic cuttings and water quality results. Tetra Tech was responsible for the design, bidding, construction and testing oversight, aquifer testing design and analysis, and preparation of a summary report for two exploratory test/production wells screened in the Gray Limestone aquifer.

Toho Water Authority/Water Cooperative of Central Florida – Cypress Lake Wellfield Hydrogeological Assessment, FL. Task Manager and technical lead for aquifer testing, data analysis, groundwater modeling, and water use permitting. Tetra Tech performed data analysis, modeling and other tasks needed to select suitable testing sites for evaluation of future wellfield sites, preparing the exploratory testing program, and preparing plans and specifications to bid the work. Comprehensive aquifer testing was undertaken to support well and wellfield design and permitting by the South Florida Water Management District (SFWMD) of a new 37.5 million gallons per day (MGD) wellfield using the LFA as the source of supply. This project comprised completing at

EDUCATION

MS, Geology, University of Florida, 1986

BS, Geology, University of Florida, 1981

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #1228, Georgia, #1411

YEARS OF EXPERIENCE	33
YEARS WITH TETRA TECH	22

two sites 6-miles apart, construction of a full-scale test well into the Lower Floridan aquifer (LFA), one multizone observation well, two LFA single-zone observation wells, and three surficial aquifer observation wells. We performed two multi-well aquifer performance tests (72 hour and 14-day) at the northern site and three multi-well aquifer performance tests at the southern site. Data analysis comprised removal of regional and antecedent trends, estimation of aquifer properties for the UFA and LFA at each location, construction and calibration of a regional groundwater flow model, and prediction of long-term suitability by evaluating potential for excessive drawdown in the source and overlying aquifers. The potential for unacceptable upconing of saline groundwater was evaluated using the USGS solute transport code SEAWAT and an analytical code. Data from the test borings and geophysical logs were used to predict the feasibility of constructing a deep injection well for disposal of RO by-products. Tetra Tech constructed and calibrated a regional groundwater flow model of the Floridan aquifer system to demonstrate the absence of significant impacts to existing groundwater users and natural systems. An application was submitted for a 37.5 MGD brackish water source wellfield, and SFWMD issued the WUP in August 2011.

Confidential Client, Upconing and intrusion modeling in southern FL. Tetra Tech modified and recalibrated a subset of the SFWMD East Coast Floridan Aquifer System (ECFAS2) SEAWAT model to focus on potential pumping impacts of a proposed wellfield in southeast Florida. The revised model was recalibrated using head and concentration targets from the ECFAS2 model, as well as aquifer performance testing (APT) data from two local constant rate discharge tests. The new model was used to demonstrate the magnitude of water quality changes at the proposed wellfield caused by lateral intrusion and upconing, as well as the magnitude of drawdown at the wellfield and at other existing wells.

Northeast Wellfield and CW Combee WTP, 2006 (and 1991, 2001, Miami Corporation v Titusville Administrative Law Hearing, 2005-2007 Senior Hydrogeologist responsible for evaluating opposing experts work (modeling, aquifer testing, well and wellfield design) as well as assisting client attorney during depositions and trial, conducting independent aquifer testing, and simulating wellfield effects using MODFLOW. Testified in 3 days of deposition and in a Florida Administrative Law trial.

2003), City of Lakeland, FL. Tetra Tech geologists designed, tested, and permitted with the SWFWMD a new 9 MGD AADF (16 MGD PMADF) wellfield for the City of Lakeland, FL. Our wellfield design optimized well location and design to minimize interference among the five wells in the proposed Northeast wellfield and to limit drawdown impacts at offsite users' wells and in on-site and nearby wetlands. Aquifer performance tests were completed in 1989, 1991, 2001, and 2003 as part of permitting and to satisfy the water management district that aquifer properties at the wellfield were well understood. In 2006 the City added another well at the CW Combee WTP and completed and analyzed an 11-day APT. Tetra Tech constructed and calibrated a regional groundwater flow model (MODFLOW) to simulate the predict impacts of the proposed pumping.

Lakeland v SWFWMD Florida Administrative Law Hearing, FL. Senior Hydrogeologist responsible for evaluating opposing experts work (modeling and aquifer testing) as well as assisting client attorney during depositions and trial, conducting independent aquifer testing, and simulating wellfield effects using MODFLOW. Testified in deposition and in a Florida Administrative Law trial.

Confidential client SE Florida – Deep injection well injectate compatibility analysis, FL. The analysis consisted of a series of simulations of aqueous geochemical reactions that would be expected to occur as the result of mixing RO byproduct injectate with stack blowdown and groundwater and the reactions that would be expected to occur between raw injectate and the matrix of an aquifer composed of dolomite and calcite. We simulated mixing and reaction using the USGS code PHREEQC to confirm that routine and extreme compositions of injectate would not significantly decrease injection capacity of the well. PHREEQC modeling confirmed compatibility of the fluids and matrix of the aquifer in the injection zone under ordinary temperatures and operating concentrations.

Punta Gorda, FL – Shell Creek Water Treatment Plant RO Supply Hydrogeologic Investigation and Deep Injection Well, 2015 – 2017 To address TDS requirements as well as an administrative order to remove arsenic from the aquifer storage and recovery (ASR) wells and to discontinue the use of the ASR wells, the City of Punta Gorda retained Tetra Tech to perform the design and implementation of a new groundwater source and a new reverse osmosis (RO) treatment system. The objective of the project was to reliably produce 10 MGD of potable water using RO membranes to treat groundwater and then blend with potable water from the existing surface water treatment process. Existing ASR wells were converted to groundwater supply wells and new test/supply wells were also added as part of this project. By-products of RO treatment will be disposed of in a Class I deep injection well (DIW). Served as technical lead for design of Floridan production wells and Floridan/intermediate/surficial, and surficial aquifer production and observation wells, well and aquifer testing plan design, geophysical log interpretation, flow zone characterization, aquifer test analysis, performed MODFLOW simulations to estimate Floridan aquifer yield and managed close-out of the project to construct a 3,250 feet deep DIW and 2,450 feet deep dual-zone monitoring well.

ALEX MONTALVO
SURVEY/GIS

His GIS experience is a tremendous benefit to all disciplines because of his ability to analyze and exhibit complex data, and ability to place this information in the hands of key decision makers. His expertise includes an intense focus on spatial analysis and statistical validation. He has strong professional experience with modeling and problem solving in GIS. This includes GIS database development from the design to implementation phases. He works closely with our groundwater modeling staff by using geospatial transformation translate the source hydrogeologic data to a format that the groundwater flow code can utilize. He uses GIS in many other ways including the site selection process, raw water line routing and system designs. He has water well construction and water quality sampling field experience to bolster his GIS analyst work, allowing him to better understand the GIS work product that is required.

EXPERIENCE

PortMiami Hydraulic Analysis and Upgrades Recommendations, Miami, FL. GIS Analyst. The Miami-Dade Water and Sewer Department requested that **Tetra Tech assist in prep**aring a multi-year capital plan for PortMiami, which necessitated extensive coordination with the Seaport and Water and Sewer Departments. A substantial amount of field work conducted by Tetra Tech was successfully coordinated with MDWASD, PortMiami, equipment manufacturers, and others, without impacting any cruise or cargo operations on one of the busiest Ports in the world. Existing infrastructure data was analyzed and prepared for Hydraulic Modeling effort including the identification of existing asset locations for installation of calibration and monitoring equipment.

Water Master Plan Update, Miami International Airport, Miami-Dade Aviation Department, FL. Senior GIS Analyst. The Miami International Airport Water Master Plan Update required a hydraulic analysis of Miami-Dade Aviation Department's water transmission and distribution network with respect to both existing and projected water demands. The available AutoCAD drawings on record were developed as part of the map preparation used as the basis of the WaterCAD V8i model application. Miami-Dade Aviation Department had limited access to GIS based software, therefore, Tetra Tech provided access to the MIA water facilities inventory through the Google Earth application by use of kmz files. This allowed non-GIS users to view GIS shapefiles in the office or in the field. Several of the operations and maintenance activities related to the backflow prevention devices testing and certification, the water valve exercising and the fire hydrant flow exercising are being integrated into one overall geodatabase that can be accessed through various non-GIS applications such as MS Access, MS Excel, AutoCAD Viewer, ArcGIS Explorer, and Google Earth.

20-Year Collection System Master Plan, City of Clearwater, FL. GIS and Condition Assessment Lead. The City of Clearwater's collection system consists of 72 pump stations 370 mile of gravity sewer, 38 miles of force main and over 8,300 manholes spread over three wastewater service areas. The field work for the master plan consisted of a condition analysis and drawdown test of all lift stations and air release valves as well as a review of gravity sewer CCTV data and identification of areas with high incidences of SSOs. Additional information from the City's ongoing I&I projects were also incorporated into the analysis. All assets were assigned a condition and criticality based on the field review and a business risk evaluation was performed to assist in identifying areas

EDUCATION

AA, University of Florida, 1995

REGISTRATIONS/ CERTIFICATIONS

URBAN and Regional Information Society of America

YEARS OF EXPERIENCE	23
YEARS WITH TETRA TECH	15

of concern and prioritizing capital projects. The results of the condition assessment and business risk evaluation were linked with the City's existing GIS and asset management platform.

Gravity Sewer CIPP Rehabilitation Phase 2, Toho Water Authority, FL. Database development and application design. An ArcSDE database was developed that allowed for multiple PACP certified engineers to review of over 530,000 linear feet of sanitary CCTV data through a web map interface, Engineers reviewed video and inspections and then provided repair and rehabilitation reccomendations directly in the web map. A quality assurance/ quality control system was integrated into the online map interface that allowed senior engineers to review reccomendations and make adjustments. Repair and Rehabilitation design drawings were created in the GIS environment rather than the traditional CAD environment using the ArcGIS production mapping extension. This allowed for fast tracking the project design in order to meet the clients aggressive schedule. Drawings were sent to bid within 8 months of project initiation.

McCarty Ranch Water Master Water Supply Plan, City of Port St. Lucie, FL. GIS Analyst. The project includes the creation of 20-year growth projections for the water, wastewater, and reclaimed water systems, determining future water supply needs over the planning period, evaluating the capacity of the existing sources of supply, updating the system hydraulic models, developing future water supply alternatives, and preparing a conceptual layout and cost estimate for the selected water supply alternative. A key water supply alternative to be evaluated is withdrawal of surface water from the C-23 canal for storage in a reservoir, treatment facility, and aquifer storage and recovery facility proposed to be constructed on the 3,900-acre McCarty Ranch site owned by the City. GIS analysis included identifying existing population and demographic data and analyzing that information against future projections provided by BEBR and ESRI population projections to develop reliable future demand scenarios.

Water, Wastewater, & Reclaimed Water Master Planning, Miami-Dade County, FL. GIS Analyst. GIS Analysis for this effort serves to identify and quantify water, wastewater, and reclaimed demands throughout Miami-Dade County's existing and potential service areas. This effort also includes identifying unserved areas, projecting demands, and developing alternatives for future utility service connections. Existing utility assets from other owners in the county are analyzed to identify any potential conflicts. In addition to utility data, detailed analysis of planning datasets such as zoning, special districts, and existing and future land uses are performed as well. This effort relies heavily on large volumes of GIS based data; therefore, it is important to make these infrastructure and planning data available to project engineers through an enterprise GIS environment.

Water, Wastewater, and Reclaimed Water Master Plan, Clermont, FL. GIS Analyst. In this effort, GIS analysis was performed to prepare the City's existing utility infrastructure assets for modelling efforts. Actual utility billing data was geocoded and correlated to service locations in order to calculate existing demands of the water, potable irrigation, wastewater, and reclaimed systems. Analysis of the water use data, existing land use, future development plans, and modelling outputs were used to develop strategies for conversion to reclaimed water, where feasible, and to develop CIP recommendations.

Wastewater Force Main System Evaluation, City of Orlando, FL. Provide analytical assistance to project engineers to evaluate existing and future conditions of large Force main system. Utilize City's TAZ based population and planning data to establish existing and future condition flow estimates for Lift Station tributary areas. Identify potential utility conflicts with other existing and planned utilities including water, wastewater, gas, and telecommunications.

Stormwater 30% Preliminary Design, Town Fort Myers Beach, FL. Senior GIS Analyst. Preliminary design report (PDR) for the remaining side streets of Fort Myers Beach. Design included the utilization of 2D hydrologic and hydraulic modeling to identify areas of nuisance flooding and deficient infrastructure. These results aided in the development of preliminary designs for stormwater improvements for more than 27,000 linear feet of roadway within the Town right-of-way. Projects were scored based on benefit provided to the residents. GIS was utilized for development of existing conditions surface model based on LiDAR and subsequent inundation

GIS Field Services, City of Tarpon Springs, FL. GIS Consulting and Database Design. Develop a field collection program through ArcSDE to inventory and GPS water, wastewater and reclaim assets at a survey grade accuracy level. ArcSDE database was developed for field technicians to locate and inspect assets using mobile tablets and an RTK enabled antenna. Collection included photo-documentation and form based asset inspection. This information will be incorporated into the City's developing enterprise wide GIS system.

Living with the Bay Management Plan, New York State Housing Trust Fund Corporation (NYSHTFC), NY. GIS Analyst. Comprehensive analysis of historical storm surge and flooding scenarios, hydrologic conditions, and existing infrastructure to provide Storm Event resiliency recommendations, this effort included GIS based basin delineation in support of hydraulic modelling

CS-1831 Drainage Charge Assistance, City of Detroit, MI. GIS Consultant. Assist in development of the impervious area based drainage charge that will be used to fund a variety of Green Infrastructure projects throughout the City of Detroit.

MICHAEL MOSSEY, PSM
SURVEY/GIS
KEITH & ASSOCIATES

Mr. Mossey has over 40 years of experience in land surveying and mapping in South Florida. He has extensive senior project management experience for large-scale projects and continuing service, on-call type contracts for both public and private sector clients. He is a highly talented Quality Surveyor with a successful track record in budget estimation, valuation of items and completing projects on time. Mr. Mossey's experience includes a wide range of projects incorporating GIS deliverables for various agencies including Broward County, the Federal Aviation Administration (FAA) and municipalities.

EXPERIENCE

A-1-A / S.R. 814 Atlantic Boulevard, Pompano Beach, FL. As Survey Project Manager, Mr. Mossey prepared extensive Topographic Design Surveys for this Pompano Beach CRA roadway improvement project. Project included design and right-of-way survey as well as a FDEP Coastal Topographic Survey required for design and permitting of coastal roadways, pedestrian walkways, and beach and dune beautification improvements. Concept includes reconstruction of roadway, water, sewer and drainage, streetscapes and beatifications.

Boca Raton Water Supply Wells 28W, 31W &33W, Boca Raton, FL. The City of Boca Raton was looking to install 3 new water-supply wells including surface equipment along a right-of-way or easement between Don Estridge High Tech Middle School and the proposed Countess de Hoernle Park. The site is located south of Spanish River Blvd, east of Military Trail, and west of I-95. As a sub-consultant to CDM, KEITH providing surveying services for this project site which is an undeveloped property corridor located at the SW ¼ of Section 12, Township 47S, Range 42E within the city limits of Boca Raton.

City of Deerfield Beach and CRA Miscellaneous Surveying and Mapping, Deerfield Beach, FL. KEITH is currently provides ongoing continuing services providing on-call general surveying and mapping services to the municipality and CRA on an as needed basis for all transportation and municipal projects. Mr. Mossey serves as Senior Project Surveyor.

City of Pompano Beach and CRA General Engineering, Surveying and Mapping Services, Pompano Beach, FL. KEITH is currently providing general engineering, and surveying and mapping services to the municipality and CRA on an as needed basis for all transportation and municipal projects. Mr. Mossey serves as the Senior Project Surveyor.

Design/Build Pier Parking Garage, Pompano Beach, FL. The new parking garage includes five stories, 625 parking spaces, speed ramp to facilitate access to higher levels of the garage and retail space on the ground level fronting NE 3rd Street and the new Pier Street. As part of the design/build team, KEITH was responsible for Planning, Surveying, Utility Coordination/ Investigation, Civil Engineering, Landscape and Irrigation Design, Permitting and Construction Inspection of the project.

General Engineering/Surveying Services Contract, Pompano Beach, FL. Through our continuing services contract, KEITH has provided surveying and mapping services for multiple parks and publics spaces within the City. As Survey Project Mnager Mr. Mossey prepared Boundary and Topographic surveys, as well as sketches of description for Pompano Community Park, Highlands Park, Alsdorf Park, Rustic Bridge Park, Founders Park and Lovely Park.

EDUCATION

Maryville College, Maryville, Tennessee

REGISTRATIONS/ CERTIFICATIONS

Florida Professional Surveyor & Mapper #5660

YEARS OF EXPERIENCE	40
YEARS WITH KEITH	11

Pompano Beach Boulevard Streetscape, Pompano Beach, FL. Mr. Mossey was responsible for the Coastal Hydrographic and Topographic Surveys for Florida Department of Environmental Protection (FDEP) Permitting for the design and construction of the roadway and pedestrian pathways adjacent to the beachfront. The project was situated seaward of the Coastal Construction Control Line therefore the design required extensive hydrographic and topographic survey in accordance with the requirements of the Florida Department of Environmental Protection-Division of Beaches and Shores as set forth in Section 62B-33.0081.

Pompano Beach Oceanside Fire Station #11, Pompano Beach, FL. KEITH is working with a team of consultants with the primary responsibility of surveying and platting to construct a new barrier island Oceanside Fire Station (Station # 11) in Pompano Beach. The proposed site required a land use plan amendment, rezoning, platting and site plan approval before the station could be permitted. KEITH coordinated with City staff and other consultants to properly time the plat approval in conjunction with the plan amendment as well as coordinating with the architect and FDOT for the plat opening along A-1-A for the fire station driveway. As Survey Project Manager, Mr. Mossey prepared Boundary and Topographic Design Survey including tree locations and identifications for this new public facility station on A-1-A including offsite improvements. Services included easement vacations plat preparation, processing and recordation.

Pompano Beach Fire Station #103, Pompano Beach, FL. As a sub-consultant to Currie Sowards Aguila Architects, KEITH responsibilities included the following services: preparing boundary and topographic surveys; plat preparation and processing; preparation of documents and attendance meetings for the site plan approval; pre-application meeting with agencies having jurisdiction; prepare all required bidding and construction documents for the projects, design plans, supplementary contract requirements, technical specifications and cost estimates; provide assistance for LEED BD+C rating documentation and processing; prepare and process all required plat permit applications and submittal packages as required for permit issuance of all agency permits.

Pompano Beach GIS Mapping Services Pilot Project, Pompano Beach, FL. KEITH was tasked to locate all water meters and valves, sanitary manholes and cleanouts, and storm drainage inlet structures and manholes with at least sub-meter grade GPS (Global Positioning System). The general limits of the project are from McNab Road (SE 15th Street) to the southerly edge of water of Lettuce Lake (just North of SE 8th Street) and from the easterly right-of-way of Federal Highway to the westerly edge of water of the Intracoastal Waterway. Mr. Mossey served as Senior Project Surveyor for this GIS project and is currently working in this geographic area and progress up to 1,550 data points. Once completed, KEITH will edit the files by moving the existing utilities, including any pipes, services or laterals that connect to the structure, to the true, GPS-verified location. The attribute data attached to each utility will remain unchanged.

South Florida Water Management District Acme Basin B Discharge Project, FL. Project included the reconstruction limits of C-1 Canal and Flying Cow Roadway Right of Ways from S.R. 80 to the L-40 Levee. Mr. Mossey served as Senior Survey Project Manager for this 4.5-mile canal expansion and roadway reconstruction project in Wellington. Project included a complete topographic design survey, canal cross-sections, right of way determination, title document review, and horizontal and vertical control for South Florida Water Management Control District. Sketch of descriptions were also prepared for land acquisition parcels.

South Florida Water Management District General Surveying Services, FL. As a Sub-Consultant to Calvin, Giordano & Associates, Inc., KEITH provides on-call general surveying and mapping services and many SFWMD projects including the Laspal Monitoring Station Project (well site – establishing new horizontal and vertical controls), G-16 Boundary Survey (establish 2 miles of horizontal control and map features), C-14 Boundary Survey (establish 4 miles of horizontal control and map features), Cell 2 (establish new horizontal and vertical control at via GPS at 7 remote sensing sites), C-16/G-14 Row Map Recording (Establish 5 miles of horizontal control and map features within the canal right-of-way) and the Hillsboro Canal Project (Complete a topographic survey of approximately 5 miles of canal bank for erosion issues including cross-sections within the waterway).

S.R. 811/ Dixie Highway, Pompano Beach C.R.A, Pompano Beach, FL. Mr. Mossey serves as the Project Surveyor for this design and right-of-way survey including 1-mile of State Road 811, the adjacent F.E.C. Railroad R/W and municipal roadways within the historic downtown district. Project included a complete topographic design and right of way survey, title document review, and horizontal and vertical control. Sketch of descriptions were also prepared for land acquisition parcels and roadway and utility vacations.

DANIEL "DANNY" NELSON, PE
SRF ASSISTANCE

Mr. Nelson has assisted with over $200M of funding assistance through the State Revolving Fund (SRF) process and over $75M of similar alternative funding (USDA, direct appropriations, bonds, grants, etc. Mr. Nelson's experience has followed from inception and planning through financial approval and documentation. Mr. Nelson has worked on funded projects for over 20 years and has been personally acquainted with members of both the Clean Water and Drinking Water staff of FDEP's SRF program throughout this period.

EXPERIENCE

Mr. Nelson's relevant SRF funding experience for which he has performed each of the above described SRF components is provided below:

Southwest 6 & 7 Utility Extension Program, City of Cape Coral, FL. $73M of SRF Funding through the Clean Water and Drinking Water Programs- Program Manager and SRF Manager for the expansion of the City's water, wastewater and irrigation systems to a 4 square mile area south of Pine Island Road. The project includes value engineering, hydraulic modeling for water, wastewater and irrigation systems, design, permitting, bidding and construction management. The project includes over 200 miles of potable water, wastewater collection, wastewater transmission and irrigation utility piping; 18 lift stations and a stormwater canal pumping station to supplement reclaimed water during high demand periods.

Potable Water System Improvements, Fort Myers Beach, FL. Over $20M of Drinking Water Funding to Date; $30M approved and in process of construction over the next 5 years. SRF Manager for improvements consisting of replacing aged 3- and 4-inch galvanized pipe with 8 and 10-inch C-900 PVC water mains to serve the residential areas throughout the Island as well as performing stormwater and roadway improvements. Pipe sizing was determined through hydraulic modeling efforts to meet fire flow requirements. The project consists of over 200,000 linear feet of water piping.

Stormwater System Improvement Program, Fort Myers Beach, FL. Over $30M of Stormwater Improvements approved for funding through Clean Water SRF. SRF Manager for the implementation of stormwater improvements throughout the entire island. The Town is responsible for stormwater along all residential streets consisting of over 26 miles of stormwater system improvements.

Donax Water Reclamation Facility Expansion, City of Sanibel, FL. $3M of SRF Clean Water Funding. Project Manager and SRF Coordinator for the design, permitting, bidding, and construction management services for the expansion of the Donax Water Reclamation Facility from 1.6 MGD to 2.375 MGD. The expansion includes demolition of an existing deteriorated 0.8 MGD ring steel plant and digester, and the addition of two new 0.80MGD concrete plants with anoxic zones for nitrogen removal, sludge stabilization and thickening facilities, filtration, disinfection, reclaimed water pumping and storage, reject storage, and odor control facilities. Improvements also included upgrading the aeration

EDUCATION

BS, Civil Engineering, Florida State University, 1996

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #56152

YEARS OF EXPERIENCE	23
YEARS WITH TETRA TECH	23

facilities, addition of a rotary drum sludge thickener, non-potable water system, and a pretreatment structure for screening and grit removal.

4.0 MGD Shell Creek Reverse Osmosis Water Treatment Plant, City of Punta Gorda, FL.$40M of SRF Drinking Water Funding. Client Manager and SRF Lead for the design, permitting and implementation of a new 4.0 MGD reverse osmosis groundwater treatment plant (expandable to 8.0 MGD to supplement the existing 10.0 MGD Shell Creek Surface Water Treatment Plant. Project includes high pressure membrane treatment, blending facilities (for surface water and finished groundwater), a new 2.0 MG ground storage tank, new raw water wells and a deep injection well for concentrate disposal.

Water and Wastewater System Improvements, DeSoto County, FL. $15M of SRF Grant/Loans through Clean and Drinking Water Programs. Project Manager and SRF Lead for the design, permitting and construction management for improvements of water and wastewater system improvements, which consists of over 20 miles of potable water main, over 20 miles of wastewater force mains, 2 potable water storage tanks, wastewater pumping stations, and a 500,000-gallon wastewater treatment plant and public access spray irrigation field.

Stormwater Lake Stabilization Improvements, Gateway Services CDD, Lee County, FL. $6M of Clean Water SRF Loan. Program Manager and SRF Lead for the planning, design, bidding and construction oversight for the repair to 13 lakes within the Gateway Services Community Development District which had been damaged from erosion and in need or repair. Following analyzing the extent of erosion and piloting various methods of repair, it was decided to perform the repair using a geosynthetic material that works in conjunction with vegetation to restabilize the banks (vegetative stabilization reinforcement system).

Wastewater and Reclaimed Water System Expansion, City of Sanibel, FL. Over $10M of SRF Clean Water Funding. Project Manager and SRF Lead Contact. Due to environmental concerns, the City purchased the primary collection/transmission system in 1991 from Sanibel Sewer System, LLC and began a program to implement a complete city-/island-wide public wastewater and reclaimed water expansion program. Assisted with the initial utility acquisition as well as with master planning, design, and implementation of the majority of the infrastructure consisting of over 15 miles of wastewater gravity collection, force mains, wastewater pumping stations and reclaimed water transmission piping.

Other Related Funding Experience

State Appropriations

- **City of Sanibel – Donax Water Reclamation Improvements – Nutrient Removal - $825,000**
- **City of Punta Gorda – Shell Creek 4.0 MG R) WTP - $900,000**
- **Hendry County Sewer System Improvements - $400,000**
- **Hendry County – Airglades to Clewiston Wastewater Force Main - $600,000**

USDA Rural Development

- **Hendry County – Banyan Village Water System Improvements - $8.3M (grant and loan)**
- **Hendry County – Port LaBelle 0.9 MGD RO Water Treatment Plant - $4.0M (grant and loan)**
- **DeSoto County – Water and Wastewater System Improvements - $2.0 M grant**
- **Charlotte Harbor Water Association - $20M ($5.3M in Grant)**

FDEP Water Quality Grant

- **Charlotte County – Spring Lake Sewer System Improvements $1,000,000**

FEMA – Hazard Mitigation Grant Program

- **Town of Fort Myers Beach Stormwater Improvements >$5M**

American Recovery and Reinvestment Act Funding

- **Lehigh Municipal Services Improvement District – Harns Marsh Water Control Structures - $5M (1st ARRA project awarded in Florida)**

Municipal Bonds

- **City of Cape Coral – 2003 Series Water and Sewer Bond – Annual Report Preparation**
- **Gateway Community Development District**
  - **2003 Water and Sewer Bond – Annual Engineer's Certification**
  - **2007 Refunding Bonds – Annual Engineer's Certification**
  - **2013 Pelican Preserve Refunding Bonds – Bond Acquisition Assistance & Annual Engineer's Certification**
  - **2014 Water and Sewer Bonds – Bond Acquisition Assistance & Annual Engineer's Certification**

NISHANT JOSHI, EIT
STRUCTURAL ENGINEERING

Mr. Joshi joined Tetra Tech in December 2015 as a structural project engineer working toward obtaining his professional engineering (PE) licensure. He has experience in the design and analysis of steel framed structures, reinforced masonry, reinforced concrete, timber, retaining structures, and utilizing deep and shallow foundations, preparing cost of opinions and performing construction administration tasks. He has worked on projects for water treatment facilities, federal government, Department of Defense (DoD), municipal, industrial, commercial, and the assessment and renovation of existing structures. Mr. Joshi is a proficient user of RISA Software, Mathcad, ENERCALC, Revit, AutoCAD, Hilti Profis, and RS Means Costworks.

EXPERIENCE

Malcom Road Water Supply Facility, Orlando, FL. Project Engineer. Cost of opinion and construction administration of water treatment building that includes space for chemical storage, electrical equipment, generator, and pipe gallery. Building construction consists of CMU walls, hollow-core roof diaphragm, and cold-formed steel trusses.

North Secondary Treatment System Improvements, City of Grand Rapids, MI. Project Engineer. Responsible for design and drafting of CMU screens building.

NorthWest Regional Water Reclamation Facility Expansion, Hillsborough County, Tampa, FL. Lead Project Engineer. Responsible for design, drafting, cost of opinion, and construction administration of blower CMU building, flow equalization CMU building, and electrical CMU buildings

Storm and Surface Water Augmentation to Reduce Ground Water Demands for Irrigation at the Alexander Avenue Water Management Site, Deltona, FL. Project Engineer. Designed and drafted aluminum canopy, slab on grade, concrete flocculation tank, and concrete chlorine contact tank. Responsible for entire project construction administration. The treatment facilities at the Alexander Avenue Water Management Site designed to treat up to 4 MGD AADF stormwater.

TOHO Water Authority, Cypress West Water Reclamation, Osceola County, FL. Project Engineer. Designed and drafted aluminum canopy, slab on grade, CMU electrical building, concrete chlorine contact tank, and aluminum canopy. Responsible for entire project construction administration. The treatment facilities designed to treat up to 6 MGD.

Water Resource Recovery Facility Headworks Improvements, City of East Lansing, MI. Project Engineer. Assisted in construction administration headworks facility including fine screens, influent wastewater pumping, and grit removal for a peak design flow of 62 MGD.

Milk River Priority 1B, Wayne County, MI. Construction Administration Services. Reviewing all structural construction submittals and responding to all contractor questions and construction issues related to structural engineering. Project consists of various improvements to a 1950's pump station including new concrete loading platforms, new wall openings in existing pump station and modifications to an existing bridge crane support system.

EDUCATION

MS, Civil Engineering, Syracuse University, Syracuse, NY, 2014

BE, Civil Engineering, University of Mumbai, Mumbai, India, 2013

REGISTRATIONS/ CERTIFICATIONS

Engineer in Training, Structural, Kentucky No. 15419

YEARS OF EXPERIENCE	5
YEARS WITH TETRA TECH	2

Georgia Pacific Foley Pulp Mill Waste Water Improvements. Project Engineer. Assisted in the design, drafting and construction administration of cooling tower foundation, concrete tanks, and support structures including an electrical building and equipment foundations.

West Hickman Wet Weather Storage and Wastewater Treatment Plant Improvements, Lexington-Fayette Urban County Government, KY. Project Engineer. Responsible for construction administration and cost of opinion of the headworks facility, generator building, and other miscellaneous buried structures. The headworks structure is one large structure that combines a truck loading bay, screening building, influent and wet weather pump station, pipe gallery, grit tanks, flumes, and two overhead cranes for equipment removal. Responsible for design and drafting of underground concrete tanks.

Northeast Louisville Public Library, Louisville, KY. Project Engineer. Designed baseplates, anchor bolts and isolated concrete footing for a 40,000-square-foot library, which consisted of steel frame construction using moment and braced frames and open-web steel joist construction. Also, assisted in construction administration.

Burr Computer Environments, Inc., Miami, FL. Lead Project Engineer. Responsible for design and drafting of concrete generator pad, roof top units, and concrete foundation for electrical modulus.

River Ridge Commerce Center, Jeffersonville, IN. Project Engineer. Assisted in design, drafting and construction administration of two steel building. Two building were Office Building and Conference Center with 72,000 square feet and 37,000 square feet of area respectively.

South Central Louisville Public Library, Louisville, KY. Project Engineer. Designed baseplates, anchor bolts and isolated concrete footing for a 40,000-square-foot library, which consisted of steel frame construction using moment and braced frames and open-web steel joist construction. Also, assisted in construction administration.

Building 254, Wright Patterson AFB, OH. Project Engineer. Assisted in drafting and miscellaneous engineering of 15,100 square feet of new administrative space over three floors to be constructed within an existing high bay building. The new structure consists of composite floor systems and an elevator to service all levels of the building including the basement.

Victory Park Sprayground and Playground, Louisville Metro Parks & Recreation, Louisville, KY. Lead Project Engineer. Designed and drafted of CMU addition to existing building and wood canopy.

Jefferson Memorial Forest Trail, Louisville Metro Parks & Recreation, Louisville, KY. Lead Project Engineer. Designed, drafted, prepared cost of opinion and construction administration concrete retaining walls and timber pile foundation for pedestrian 90 feet long bridge.

JENNIFER ROQUE RIBOTTI, PE
WATER TREATMENT SPECIALIST

Ms. Ribotti is highly qualified in the areas of drinking water treatment, potable reuse treatment, facility hydraulics, membrane treatment technology and pilot and demonstration design and operation. Her experience includes assisting in the planning, design, and construction administration of membrane treatment facilities for drinking water and alternative water supplies, chemical feed systems, transmission mains, water quality characterization and testing, wastewater lift stations, and gravity sewer systems.

She is instrumental in designing treatment FAT systems for direct potable reuse in Florida, having worked on the Hillsborough DPR project and currently on the City of Daytona Beach's DTS direct potable reuse demonstration project.

EXPERIENCE

Well No. 44 Improvements, City of Daytona Beach, FL. Project manager and engineer of record for engineering design and permitting assistance on rehabilitation of the City's existing Well No. 44, including preparation of construction drawings and technical specifications at the 75%, 100% and bid design levels. Design modifications include well pump design, electrical service, fiber optic modifications and installation, instrumentation and controls, discharge piping and appurtenances, connection to existing dry raw water main and raw water main to the water treatment facility.

Water Model Update, City of Deltona, FL. Project Engineer for a Disinfection Byproduct Study conducted for the City for 15 water treatment plants that provide potable service to the entire City and some unincorporated areas of Volusia County. The City had exceeded formation rates of THMs and HAAs during their chlorine disinfection process. Various compliance methods were investigated and the City selected the addition of ammonia as the means of controlling THM and HAA formation. Bench scale testing was performed on seven of the lower quality wells and included a CD/D and SDS-DBPF study. Following the bench scale studies, a preliminary design report (PDR) was submitted with the evaluation of anhydrous ammonia, ammonium hydroxide and ammonium sulfate products with respect to preliminary capital cost, chemical O&M cost and nonmonetary considerations. The City selected ammonium sulfate and the project is currently in preliminary design phase including design drawings showing modifications to existing ground storage tanks and high service well stations.

DBP Control Program Improvements for Group A and B Water Treatment Plants, City of Deltona, FL. Engineering support for design, permitting, bidding and construction services of ammonia feed and storage facilities at individual WTP sites. Preliminary design included the size and location of the chemical feed facilities and identified piping and/or tank modifications needed to ensure 4-log virus removal with free chlorine. Final design included preparation of bid documents, engineering drawings and specifications, and preparation of a comprehensive project operations and maintenance manual that contains operator guidance for operating the facilities.

3.0 MG Ground Storage Tank, City of Clermont, FL. Project Engineer for a Disinfection Byproduct Study conducted for the Eastside Water Treatment Plant. Due to elevated total organic carbon (TOC) levels discovered during the final design stage of the Westside

EDUCATION

MS, Environmental Engineering, University of Central Florida, 2012

BS, Environmental Engineering; University of Central Florida, 2010

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida #81226

YEARS OF EXPERIENCE	7
YEARS WITH TETRA TECH	7

Water Treatment Plant. Analyses were performed to determine the feasibility of eliminating substandard wells in the western distribution system and supplying water from existing wells in the eastern distribution system. Seven existing wells serving the Eastside distribution system were sampled and basic water quality analyses (conductivity, temperature, pH) were performed on-site to characterize the raw water samples. Bench scale testing was performed on samples, including a chlorine demand/decay (CD/D) study and a simulated Distribution System Disinfectant By-product (SDS-DBPF) study in accordance with Standard Methods Procedure 5710-C. Trihalomethane (THM) and Haloacetic Acid (HAA) formation curves were constructed for each well from the DBPF results. The results were summarized into the Combined System Feasibility Study submitted on the Westside Water Treatment Plant.

Groundwater Replenishment Program – Bench, Pilot and Field Testing, City of Clearwater, FL. Engineering support for the final design, system start-up, operation and technical support for the 12 month operation of an indirect potable reuse pilot water purification treatment system (~25 gallons per minute) to demonstrate treatment of reclaimed water to highly purified drinking water. The pilot system includes membrane filtration (MF), reverse osmosis (RO), advanced oxidation (AOP), and deoxygenation treatment using membranes and chemicals. The work includes coordination with the City's groundwater consultant on the testing of aquifer formation whole rock cores with various pilot waters to study the cores' metals mobilization potential.

Groundwater Replenishment Program, Design of an Advanced Water Purification Facility, Clearwater, FL. Process Design Engineer on the design, permitting, bidding, public outreach and education of the Groundwater Replenishment 3.0 MGD Advanced Water Purification Plant and associated aquifer recharge system. Engineering support on the preliminary design of process including the ultrafiltration, RO, advanced oxidation process, membrane contactors, chemical feed systems, and purified water stabilization. Engineering support on design relative to planning and preparation of a 30% preliminary design report for use in third party review and the Southwest Florida Water Management District, development of contract drawings and specifications. Also managed the Building Programming meetings and workshops, that discussed the development of conceptual operations and process building with the City and District.

Arsenic Removal at Water Treatment Plant No. 3, City of Clearwater, FL. Project Engineer for the evaluation of determining cost effective alternatives for maximizing production from the City of Clearwater's Wellfield, and comparing it to the cost of directly purchasing water from Pinellas County. Maximizing production from the City's wellfield would likely necessitate the addition of advanced treatment at the Water Treatment Plant, and alternatives were proposed to the City.

Brackish Groundwater Desalination Program, San Antonio Water System, TX. Engineering support on the design of a 10.0 MGD RO Treatment Plant. Engineering support included initial membrane element design calculations, research on innovative concept developments in membrane technology, energy recovery devices and energy conservation and recovery. Assistance included hydraulic calculations, valve system tagging, chemical feed system calculations, and specifications development.

Alternative Water Supply Design-Build, City of Tarpon Springs, FL. Process Design Engineer for this design-build alternative water supply project for the City in coordination with SWFWMD. Project includes the preliminary design, design and construction of a new RO water treatment plant to produce 6.4 mgd of finished water.

Alexander Avenue Site Improvements, Phase 4A, City of Deltona, FL. Project Engineer in the design of a 4.0 MGD surface water treatment system using Lake Monroe water and storm water, which includes a surface water intake and pump station, 24-inch transmission main, site storage, filtration and disinfection treatment and effluent storage. Assistance was also provided in source water characterization of the two streams by collecting grab samples and analyzing for key water quality parameters. A chlorine demand/decay test was also performed on the source waters to determine design elements for the disinfection process.

Potable Reuse Demonstration Testing Program, City of Daytona Beach, FL. Process Design Engineer to evaluate the feasibility of direct potable reuse to treat wastewater effluent to a high level to reduce nutrient discharges to the Halifax River and preserve potable water resources. Engineering design and support provided development of a demonstration testing program to treat wastewater effluent including site plans, facility and capacity determinations, cost estimates, sampling plans, public outreach strategies, studies and design requirements. The demonstration testing program includes the design of a full scale membrane filtration, RO, and advanced oxidation train that would operate for two years to demonstrate the production of highly purified drinking water from wastewater effluent.

Eagle Pass Water Works (EPWW) System 20 Year Water and Wastewater Master Plan, TX. Project Engineer. Support was provided on the development of projected needs and demands of the City.

Eagle Pass Water Works System Water Treatment Plant Expansion/Rehabilitation, Eagle Pass, TX. Engineering support for the expansion of the existing 15 MGD Ultrafiltration Membrane Process to 19 MGD. Assistance included evaluation and design of plant components that require expansion, and components requiring rehabilitation. Prepared a Facility Expansion Technical Memorandum and Preliminary Design Report, and assisted in presenting information to the City in Workshops. Engineering assistance on 75% final design plans and specifications.

KEVIN ROE, PE
HYDRAULIC MODELING

Mr. Roe is a project engineer and hydraulic modeler with diverse experience in the study, planning, design, and construction of water, wastewater, stormwater, and general civil/site projects for municipal and industrial clients. As a hydraulic modeler, he plays an integral role in analyzing existing water, wastewater, and stormwater systems and facilities and recommending infrastructure improvement alternatives.

EXPERIENCE

Snake River Water District Base III Water Treatment Keystone, CO. November 2018 to Present. Hydraulic Modeler for the model review, update, and pumping analyses for proposed pump replacements at the Snake River Water District Base III Water Treatment Plant using InfoWater software.

Water System Hydraulic Model and Capital Improvement Program Peer Review, Quincy, MA. November 2018 to Present. Hydraulic Modeler for the review of the City's water system model in regards to calibration, demand allocation, and priority pipes for replacement using InfoWater software.

Waterline Improvements, Silverthorne, CO. Hydraulic Modeler for the model update and fire flow analyses for multiple waterline improvement projects using InfoWater software.

Paulding County Hydraulic Water System Model, Paulding County, GA. Hydraulic Modeler for the future system analyses of the Paulding County water system using WaterGEMS software. This modeling effort included analyses that incorporated a new source water supply and water treatment plant, under design at the time of this project, and phased out existing system connections for water supplied by the adjacent county.

Huntsville Utilities Southeast Water Treatment Plant Design, Huntsville, AL. Project Engineer responsible for the development of technical specifications for all process piping, valves, and hydraulic gates for the 24-MGD Southeast Water Treatment Plant.

Hampton Cove Storage and Pump Improvements Modeling and Training, Huntsville, AL. Project Engineer and Hydraulic Modeler for the water model development and system evaluation of the Huntsville Utilities Hampton Cove service area. Developed and evaluated the model which included 150 miles of waterlines ranging from 2 inches to 36 inches, 3 pressure zones, 2 booster pump stations and 2 storage tanks. The project was performed in conjunction with the design of the Southeast WTP, and the model was used to evaluate future conditions and system improvements with the WTP supplying the service area. Tasks included model development and calibration, demand forecasting, evaluating capital improvements, evaluating pressure zone modifications to improve level of service to customers and reduce pumping requirements at the Southeast WTP, and model training for the Utilities. Modeling was done using WaterGEMS software.

2013 Water System Master Plan, City of Atlanta, GA. Project Engineer and Hydraulic Modeler for the 2013 water system master plan for the City of Atlanta's Department of

EDUCATION

BS, Civil Engineering, Arizona State University, August 2008

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Georgia, #PE039494, Arizona, #62523,

NCEES Record #68028

Certified Floodplain Manager #US-18-10285

YEARS OF EXPERIENCE	10
YEARS WITH ARDAMAN	4

Watershed Management. Developed and evaluated the water distribution system model which included 2,600 miles of piping ranging from 2 inches to 72 inches, 3 treatment plants, 3 pressure zones, 6 active pump stations and 9 storage facilities. The system serves a current population of approximately 1.1 million with an average daily water demand close to 100 MGD. Specific tasks included updating the existing distribution model including importing new demands, verifying the model with measured flow and pressure data, assessing existing system performance and level of service, performing fire flow analyses, evaluating storage options to serve the downtown area under emergency water-shortage conditions, and evaluating improvement alternatives for capital improvement planning for current year (2012), 2030 and 2060. Modeling was done using WaterGEMS software.

Source Water Protection Plans - Alternative Source Water Feasibility Analysis, EPA Region 4, WV. Project Engineer for Alternatives Analysis which provided the systematic evaluation of a minimum of three source water alternatives based on economic and technical criteria to determine the most feasible option for implementation for 14 communities in West Virginia.

Reuse Water Master Plan Update, Pompano Beach, FL. Hydraulic Modeler for the model review and update as part of the City's reuse water master plan update using InfoWater software.

Gwinnett County Department of Water Resources (GCDWR) Brooks Road Pump Station Improvements Project, Gwinnett County, GA. Hydraulic Modeler for the model development, calibration, and analysis of the GCDWR Eastside Force Main System under normal operating conditions and transient wave conditions using InfoWater and InfoSurge software. This system includes three primary wastewater pump stations and two booster pump stations that tie into the same force main network. The modeling effort was done in conjunction with a wastewater pump station upgrade design project and included analysis of the system under several scenarios simulating various pumping conditions.

Hobson Street Realignment Study, Sapulpa, OK. Hydraulic Modeler for the model update, calibration, and capacity analysis of the Hobson Street interceptor sewer using InfoWorks ICM software.

Blue John West Sewer Hydraulic Model, LaGrange, GA. Hydraulic Modeler for the model development, calibration, and analysis of the Blue John West region of the City of LaGrange sewer collection system using InfoWorks CS software.

Kemosabe Lift Station and Force Main, Cotulla, TX. N Project Engineer for the design, permitting, and construction of a 500-gpm FRP sewer lift station and 7,100 ft of PVC force main.

Water, Wastewater, and Reclaimed Water Master Plans, Clermont, FL. Project Engineer and Hydraulic Modeler for the City of Clermont water, wastewater, and reclaimed water system master plans. Developed and evaluated the wastewater model, which included 24 miles of force main, 6.5 miles of gravity sewer, and 33 lift stations. Mentored junior-level engineer on hydraulic modeling while assisting on the development and evaluation of the existing and future water and reclaimed water system models. Tasks for all three systems included model development and calibration, demand forecasting, and evaluating capital improvements. Wastewater modeling was done using InfoWorks CS software. Water and reclaimed water modeling was done using WaterGEMS software.

Yellow Jacket Creek Pump Station and Discharge Force Main, LaGrange, GA. Project Engineer for the design of 15,000 ft of discharge sewer force main and 900 ft of associated gravity sewer modifications. This project was designed and constructed in conjuction with a new 7.2-MGD wastewater pump station. Provided resident engineering and construction management services during the pump station construction.

Under Previous Association

Rindt-McDuff Associates (RMA), Marietta, GA. November 2015 to November 2018. Provided civil engineering and project management services to industrial and municipal clients. Projects include the following as well as various other tasks including floodplain no-rise certifications, technical engineering review, GIS, WaterCAD modeling.

City of Adairsville Water System Hydraulic Model, Adairsville, GA. November 2015 to May 2016. Project Engineer and hydraulic modeler for the mapping, model development, calibration, future system improvement planning, and fire flow analyses of the City of Adairsville water system using WaterCAD software. This project included a detailed water model report summarizing the model setup, findings, and improvement recommendations.

DIANA SANTANDER, PE
SFWMD & FDEP PERMITTING

Ms. Santander has 22 years of civil and environmental engineering experience in the areas of design, permitting, and compliance of potable water, stormwater, wastewater and solid waste systems, She has prepared permitting packages for submittals to various municiplal, state, and federal agencies including the South Florida Water Management District (SFWMD), Florida Department of Health, Florida Department of Environmental Protection (FDEP), among others.

Ms. Santander has been responsible for managing and executing projects throughout South Florida. She has coordinated subcontractors and field personnel, analyzed data, and prepared environmental summary reports for submittal to regulatory agencies. Ms. Santander has conducted Phase I and II environmental site assessments and water and wastewater system audits. She has managed various aspects of site investigations including sampling plan preparation, planning and implementation of field activities, data evaluation, and report preparation.

EXPERIENCE

Reuse Water System Master Plan Update, City of Pompano, FL. Project Manager. This project consists of the preparation of an update to the City's Water Reuse Master Plan. The City owns and operates a 7.5 MGD water reclamation facility and the plan includes reuse at the City's golf courses, parks, play fields and road medians. In addition, to expansion to commercial properties. The updte included evaluation of the reuse proejctions, hydraulic modelling and identification of the capital programs including identification of requierements and prioritization of improvements.

Engineering and Geological Services for Water, Wastewater, and Reclaimed Water Planning, Miami-Dade County Water and Sewer Department, FL. Project Manager – Ms. Santander serves as the project manager for this $7.7M contract. Miami-Dade WASD is the largest water and sewer utility in the southeastern US, serving nearly 2.3 million residents and thousands of visitors on a daily basis. In order to continue to fulfill the department's vision of continuous delivery of high quality drinking water and wastewater services in compliance with all regulatory requirements, WASD has planned a systematic and responsible multi-year capital improvement plan. This plan focuses on providing necessary upgrades to thousands of miles of pipes, pump stations and water and wastewater treatment plants.

Flood Mitigation Grant Study, Town of Medley, FL. Project Manager: Ms. Santander was the project manager for this $500,000 grant that the Town of Medley obtained through the Florida Department of Environmental Protection (FDEP). The purpose of this project was to determine the best cost-effective alternative to alleviate flooding problems within this 266-acre industrial area characterized by severe flooding. The project included collecting runoff samples for water quality analysis and comparing them to water quality data obtained from the C-6 canal. In addition ground water and soil samples were collected, analyzed and evaluated since this area is located close to a landfill with known ammonia groundwater contamination. These conditions presented a challenge for the design of a stormwater management system. During the evaluation process, Ms. Santander coordinated and discussed alternatives with various regulatory agencies including FDEP, Miami-Dade County RER, and SFWMD.

Lake Estates Corrosion Control and Water Quality Improvement Project; City of Fort Lauderdale, FL. Project Manager- This project includes the replacement of the Lake Estates water distribution system infrastructure for the purpose of improving the quality of the potable water delivered to the residents of this neighborhood. Approximately

EDUCATION

MS, Civil Engineering, Louisiana State University, 1999

BS, Civil Engineering, Pontifical Xaverian University, Bogota, Colombia, 1996

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida #65854, ,Louisiana #32158, Republic of Colombia, #2520260414CND

OSHA 8-hour Hazardous Waste Operations and Response Supervisor

YEARS OF EXPERIENCE	22
YEARS WITH TETRA TECH	3

10,850 linear feet of 8-inch diameter PVC water mains to replace existing aged water mains were installed. Permitting involved the City of Fort Lauderdale Building Department, Florida Department of Health, Broward County Environmental Protection and Growth Management Department, and Florida Department of Transportation. The project also included surveying, geotechnical, preparation of design and construction documents, permitting, bidding review and assistance, construction administration and inspection, and project closeout and certification.

Sapa Extrusions Industrial Waste Permit Modification. Senior Engineer: Ms. Santander assisted Sapa Extrusions, Inc. in obtaining additional sewer allocation through Miami-Dade County Department of Regulatory and Economic Resources (RER) and Water and Sewer Department (WASD) for the modification of its Industrial Waste Permit for their aluminum extrusion facility in Miami-Dade County.

PortMiami Environmental Oversight and Permit Compliance. Senior Engineer: Served as a senior engineer and technical advisor for this project that consisted in providing environmental oversight services at Port Miami during the second phase of the dredging of the Miami Harbor in order to deepen Fisherman Channel in Miami, Florida. The project included the collection of water samples for turbidly measurements, field observance of dredging and blasting operation to ensure that work was being done in compliance with all state and federal environmental permits.

Miami-Dade County Water and Sewer Department Water Reuse Feasibility Study. Project Manager. Ms. Santander served as the project manager of this project that evaluated the feasibility of water reuse in Miami-Dade County. This report identifies the constraints and opportunities for reuse; establishes the level of treatment and possible infrastructure needed for various reuse scenarios; identifies potential reuse projects and provides estimates of reuse volumes. As required by the Florida Department of Environmental Protection (FDEP), the study developed low, medium, and high reuse scenarios incorporating various projects and stakeholder input. In addition, the combination of projects that will yield the reuse volume required to comply with the Ocean Outfall Legislation (OOL), 117.5 million gallons per day (MGD) of additional technically and economically feasible reuse capacity on an annual basis calculated as 60 percent of the average baseline flow rate of the North District Wastewater Treatment Plant (NDWWTP) and the Central District Wastewater Treatment Plant (CDWWTP) outfalls was evaluated. The report also includes an evaluation of the preliminary cost of the various scenarios as well as the impacts that those costs could have on customer rates. Environmental, physical, ecological and socioeconomic impacts were also analyzed.

North Dade Landfill (NDLF) Leachate Pretreatment. Project Engineer: As project engineer, Ms. Santander prepared a technical memorandum (TM) for a leachate pretreatment system for the NDLF located in unincorporated Miami-Dade County, Florida. The proposed pretreatment facility included air stripping for ammonia removal, equalization, pH control and thermal oxidation of the gases from the stripping tower. The TM included preliminary design criteria such as the water/air ratio, estimated air emissions and efficiency calculations for an air stripping system to remove ammonia prior to discharge to the sanitary sewer.

Great Lakes Chemical Corp. Groundwater Testing and Flow Modeling. Field Engineer Ms. Santander was responsible for water and soil sampling, preparing and reviewing spreadsheets, and performing surveying activities for this project located within a chemical manufacturing facility in Union County, Arkansas. Analytical data indicated that chlorides had impacted a 3.5 square mile area of groundwater beneath the facility

Department of Natural and Environmental Resources Flood Control Stormwater Pump Stations Consent Decree, San Juan, PR – Senior Engineer – This project included support to the Commonwealth of Puerto Rico Department of Natural and Environmental Resources (DNER) to address the requirements of consent decree between the DNER and the United States Environmental Protection Agency (EPA). The project included evaluation of the condition of three flood control stations in the municipality of San Juan, as well as recommendations to reduce discharges of contaminants to bodies of water to the United States.

CAROLINE SMITH
FIELD SERVICES/INSPECTION WELLFIELD CONSTRUCTION MANAGEMENT, JLA GEOSCIENCES, INC.

Ms. Caroline Smith provides experience in hydrogeologic field oversight during well construction and development phases; oversight for various drilling techniques including power auger, mud rotary, reverse air, Geoprobe, and core bores; geophysical log interpretation; implementation of well design and construction; hydrologic data collection; water quality profiling, performing field geologic analysis; and pump testing for Surficial and Floridan Aquifer projects in South Florida. Ms. Smith has overseen the construction of multiple Upper Floridan Aquifer Wells and provided 24-hour onsite construction management and coordination. Recent projects have concentrated on the construction and testing of Floridan Aquifer production wells associated with nuclear power cooling systems.

EXPERIENCE

Field Hydrogeologist, Six Floridan Aquifer Production Wells and Aquifer Performance Testing, Confidential Client, FL (2016-Ongoing) Provided field construction oversight for construction of six large-diameter Floridan Aquifer production wells; five wells completed in UFA and one dual-zone well completed in the UFA and Avon Park Producing Zone. Project includes a multi-well aquifer performance test and analysis. Project being completed under an aggressive 24 hours per day, seven days per week schedule.

Hydrogeologist, Confidential Client, FAS Well Construction Dade County, FL. (2015-2016) Provided field construction oversight for construction and testing of four (4) new, 20-inch diameter FRP Floridan Aquifer wells for freshwater supply to reduce salinity in the cooling canal system by artesian flow; and one (1) dual purpose well to provide emergency cooling of UFA water supply and provide the cooling canal system for freshening purposes. Designed for artesian flow and implemented an aggressive acid treatment program to meet design flow requirements of 14.4 MGD.

Hydrogeologist, Confidential Client, Hydrogeologic Investigation Using Collected Sediment Cores, Dade County, FL. Provided hydrogeologic and geotechnical services by collecting 40 sediment cores, using a boat, from a private canal in FL. Recovered sediment cores were logged, visually classified based on lithology, and partitioned based on sediment types to perform falling head permeability tests. Responsible for collecting and sampling the cores for sediment to analyze the lithologic characteristics, vertical permeability, and thickness of unconsolidated sediment in the canal.

EDUCATION

MS, Geology, East Carolina University, 2015

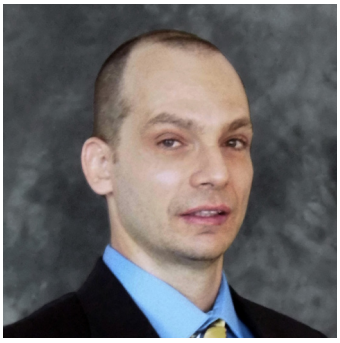
BS, Geology; East Carolina University, 2013

REGISTRATIONS/ CERTIFICATIONS

Certificate of Hydrogeology and Environmental Science, East Carolina University, 2015

YEARS OF EXPERIENCE	4
YEARS WITH JLA	4

R. SCOTT SMITH, PE
WELLHEAD FACILITIES



Mr. Smith has 20 years of engineering experience specializing in water and wastewater treatment, hydraulics, pumping and storage systems, hydraulic modeling, water reclamation and reuse, Geographic Information Systems (GIS), and project management. He is thoroughly familiar with all aspects of permitting, design, bidding, and construction of large high-profile public works projects. Mr. Smith has a demonstrated history of successful completion of complex projects on time and under budget as well as providing outstanding client service that earns repeat business.

EXPERIENCE

Advanced Water Purification Plant and Groundwater Replenishment Project, City of Clearwater FL. Served as design engineer for major process areas of 3.0 MGD capacity advanced membrane treatment facility at City's Northeast Water Reclamation Facility (NEWRF) for treating reclaimed wastewater to potable water standards and injection into Upper Floridan Aquifer for recharge and intrusion barrier. Process responsibility included modifications to existing water reclamation facility CCC basin for new reclaimed water takeoff point, pretreatment basin, pumping station for feeding ultrafiltration membranes, washwater/waste retention basin and return pump station, four Class IV injection wells with 316SS downhole hydraulic control valves for injecting recharge water, one Class I deep injection well for disposal of reverse osmosis concentrate.

Raw Water Wells 10, 11, and 14 and Raw Water Main, City of Tarpon Springs, FL. Lead Designer. Performed preliminary and final design and permitting of proposed additional Upper Floridan Aquifer brackish water supply wells 10, 11, and 14 and new HDPE raw water piping to connect to existing raw water transmission system as needed to support growing water demand from the City's reverse osmosis water treatment plant. Created and used raw water system hydraulic model and drawdown testing information to select variable speed pumps to accommodate present and projected future conditions. Submersible 500 GPM well pumps constructed of 904L stainless-steel, drop pipe of PVC Certa-Lok, and wellhead piping and valves of duplex stainless steel were specified to withstand high TDS levels >10,000 ppm. Prepared drawings and specifications for installation of submersible well pump, piping, and instrumentation (flow, conductivity, pressure and level sensors). Designed about 2,000 linear feet of new 8-inch though 12-inch butt welded HDPE raw water transmission main through power line corridor, including two directional drill crossings of County owned roadways to wet tap and tie-in with existing 20-inch HDPE raw main. Coordinated design of electrical and instrumentation for power, communications and SCADA integration.

Water Treatment Plant No. 8 LFA Well No. 1 Well Pump and Ozone System Installation, City of Deltona, FL. Process Engineer. Directed investigations, including water quality ampling/analysis and ozone demand and DBP formation testing, and prepared final design documents for installation of a submersible well pump and ozone treatment system for removal of dissolved sulfide for recently drilled Lower Floridan Aquifer (LFA) Well No. 1, to augment raw water supplies at City's existing WTP No. 8. Coordinated with

EDUCATION

Bachelor of Science - Geology; Florida Atlantic University, 1985

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #1103

40 hour Hazardous Materials Health and Safety Training, Geraghty & Miller, 1989.

YEARS OF EXPERIENCE	20
YEARS WITH TETRA TECH	5

local ozone research laboratory subconsultant to perform ozone demand and bromate formation studies as needed to confirm ozone treatability and size 60 ppd capacity **o**zone generator. Designed ozone generator system including compressor/dryer, PSA oxygen generator, ozone generator unit with plate-type dielectric blocks, and stainless-steel piping/valves housed in new precast concrete building, Mazzei type side stream injection system with pipeline flash reactor, ozone contactor, ozone degassing/destruct systems, ORP analyzer, interconnection with plant raw water line, and integration with plant SCADA.

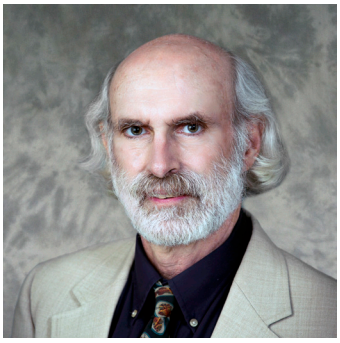
Western Storage and Pumping Facility, City of Winter Garden, FL. Project manager and lead designer for preliminary through final design of new remote re-pumping and storage facility (both potable and reclaimed water) to accommodate development in City's western service area in accordance with all regulations and state/local design standards. Identified and acquired permits to construct new facility including potable water, reclaimed water, wastewater, and stormwater permits. Assessed current water and reclaimed water systems' pumping and flow meter records to establish current system-wide AADFs, established design criteria (delivery pressures, peak factors, fire flows and storage volumes), for sizing tanks, mains and pumping systems. Analyzed raw customer meter/billing data to establish Equivalent Residential Units in gal/day for potable and reclaimed water customers.

Alternative Water Supply Project, City of Tarpon Springs, FL. Performed analysis, final design, permitting, and construction services in support of design-build project for construction of a new 6.4 MGD max-day capacity reverse osmosis WTP. Designed and permitted ~6-miles of 6" through 24" HDPE transmission piping, consisting of DR11 (directional drill) and DR 13.5 (open cut) HDPE for conveying brackish raw well water from 11 remote supply wells to the future desalination plant. Approximately half of transmission piping designed for directional drill installation due to utility congestion in ROWs, wetlands, and road crossings, with 1 cased jack and bore (FDOT road). Also designed a ~3-mile RO concentrate transmission pipeline consisting of 16" dia. DR 25 C905 PVC bell and spigot pipe, for conveying RO concentrate (high TDS) to permitted Anclote Canal ocean outfall. Produced hydraulic analysis report of the raw water wellfield for purposes of pipe sizing and well pump selection. Developed a hydraulic transients (surge) analysis of the raw/concentrate transmission systems including report presenting design/locations of surge countermeasures such as air and vacuum valves and pressure relief valves. Acquired numerous permits and agreements, inc. ROW use, FDEP wastewater, ERP, and FDEP water. Engineering for RO plant included design, permitting, and shop drawing review of valves, piping, and in-plant lift station (100 gpm duplex submersible) and forcemain system to serve the new desalination facility.

CR 214 Water Treatment Plant Raw Water Piping System Evaluation, St. Johns County, FL. Developed present worth cost evaluation of raw water supply piping alternatives for future CR 214 Reverse Osmosis (RO) water treatment plant. Evaluated use of 3 existing well pumps as part of the raw water system. Created hydraulic model of future raw water system and used model to develop and analyze 3 alternative piping system layouts. Developed present worth cost analysis to evaluate 3 piping alternatives from estimated installation costs for PVC pipe and converting estimated average annual energy costs over 20 year life cycle to present worth. Detailed results of evaluation in letter report to County.

Northwest Water System Hydraulic Modeling and Master Plan, St. Johns County, FL. Developed calibrated hydraulic model and water system master plan for St. Johns County's rapidly expanding Northwest system. Created model of existing system from County's GIS database. Allocated model demands using County's customer billing database. Assisted County staff in performing hydrant tests and used results to adjust model's pipe roughness factors. Assessed location and magnitude of future demand growth in system through 2030 by identifying current and potential residential development areas and other major users. Developed hydraulic model of future expanded system to evaluate improvements needed to accommodate projected future flow conditions through 2030, including sizes of future developer installed water mains and location, storage volume, and pump operating points of 4 future remote storage facilities.

PAUL STOUT, PHD, PG
GROUNDWATER FLOW/TRANSPORT MODELING, JLA GEOSCIENCES, INC.



Dr. Stout has more than 30 years professional experience in the general areas of: water resource evaluation; soil, surface water, and groundwater investigations; and groundwater flow and geochemical modeling. His work experiences have involved positions in teaching, research, government, and technical consulting. Projects in Florida have concentrated on water resource development and water use permitting issues, primarily associated with the largest municipal public water suppliers and other large water users of the Floridan and Surficial Aquifers. Work on these projects has involved groundwater modeling, aquifer performance testing, wellfield design and well construction. Dr. Stout has provided expert witness testimony and support for projects involving landfills, former manufactured gas plants, and water use permitting issues. While employed in academia, he received funding from state and federal agencies such as the US Environmental Protection Agency and the National Science Foundation to conduct research in the areas of hydrogeology and geochemistry. He also served as director of a state-certified analytical laboratory in Florida specializing in the chemical analysis of drinking water and environmental soil and water samples.

EXPERIENCE

Senior Hydrogeologist: Assist City of West Palm Beach in groundwater modeling and permit renewal to Evaluate Long-Term Water Supplies. Modified existing WPB MODFLOW Model including creating numerous scenarios followed by simulations assuming extreme drought rainfall conditions and development and application of WEAP modeling. Obtained 20-year permit renewal.

Senior Hydrogeologist: Assist the City of Lake Worth to evaluate the influence of future sea level riser on groundwater conditions through calibrated SEAWAT modeling of past, present, and future withdrawals from the City and ELUs and through the evaluation of technical literature.

Senior Hydrogeologist: Perform groundwater modeling and impact evaluation to respond to SFWMD Consumptive Use Permit request for additional information.

Senior Hydrogeologist: Assist Palm Beach County Water Utilities Department in evaluating climate change and sea level rise issues relevant to the County's water supply. Prepare a technical report detailing SLR and water resource management impacts.

Senior Hydrogeologist: Assist City of West Palm Beach in groundwater modeling to Evaluate Long-Term Water Supplies. Modified existing WPB MODFLOW Model including creating numerous scenarios followed by simulations assuming extreme drought rainfall conditions and development and application of the WEAP model.

Senior Hydrogeologist: Groundwater flow modeling of existing SAS wellfields to support application for CUP renewal, and preparation of Consolidated System Permit for Martin County Utilities.

Senior Hydrogeologist: - Hydrogeologic investigation, aquifer performance testing, groundwater flow and solute transport modeling for proposed golf course renovations on Palm Beach island.

Senior Hydrogeologist: Assist City of West Palm Beach to evaluate future public water supply options. Developed and applied calibrated MODFLOW groundwater model to assess feasibility of constructing SAS wellfield to augment and/or replace City's existing surface water supply. Developed and applied analytical groundwater model to evaluate potential FAS wellfield.

EDUCATION

BA, Geology; High Honors, Colgate University, 1977

MS, Geology, Duke University, 1979

PhD, Earth Sciences, Scripps Institution of Oceanography, University California, San Diego, 1985

Postdoctoral Associate, Marine Geology/Geophysics, University of Miami, RSMAS 1986

Postgraduate Research Geochemist - Marine Science Institute, University California, Santa Barbara, 1987

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, Florida, #1118

Licensed Geologist, North Carolina, #1064

YEARS OF EXPERIENCE	34
YEARS WITH JLA	1

Senior Hydrogeologist: Assist City of Lake Worth to assess safe yield for existing SAS wellfield. Development and application of MODFLOW groundwater flow model and SEAWAT variable density groundwater model to address historical and potential future saline intrusion adjacent to wellfield.

Senior Hydrogeologist: Hydrogeologic investigation, aquifer performance testing, groundwater flow modeling for private development on Jupiter Island.

Senior Hydrogeologist: Variable density groundwater flow and transport modeling to evaluate historic operations of injection well in eastern Palm Beach County.

Senior Hydrogeologist: Groundwater flow modeling to support permit application for mining operation in western Palm Beach County.

Senior Hydrogeologist: Aquifer performance testing and groundwater flow and transport modeling to develop raw water supply for reverse osmosis (RO) system in US Virgin Islands. Included evaluation of well production capacities, potential for saline intrusion, and potential influence from adjacent landfill.

Senior Hydrogeologist: – Groundwater flow modeling and South Florida Water Management District (SFWMD) permitting support for existing and proposed Surficial Aquifer System (SAS) wellfields for the Town of Jupiter.

Senior Hydrogeologist: Groundwater flow modeling to support letter modification of Palm Beach County Water Use Department (PBCWUD) consumptive use permit for their existing Surficial Aquifer System (SAS) System 9 wellfield.

Senior Hydrogeologist: Groundwater flow modeling of the Surficial and Floridan Aquifer Systems for a golf course located in Miami Beach. Model simulations evaluated potential withdrawals from Floridan Aquifer well to supply raw water for reverse osmosis system. Surficial Aquifer modeling evaluated performance of existing infiltration system as well as alternatives for concentrate discharges.

Senior Hydrogeologist: – Uniform and variable density groundwater flow and transport modeling of the Floridan Aquifer System (FAS) to evaluate salinity increases in the Glades Utility Authority (GUA) Lake Region wellfield. Model simulations assessed probable causes of salinity increases and predicted future concentration trends for potential modified wellfield operation plans.

Senior Hydrogeologist: Geochemical evaluation and variable-density groundwater modeling to address historical saline intrusion for South Martin Regional Utilities.

Senior Hydrogeologist: Hydrogeologic consulting services to support permitting and of construction of nine (9) Floridan Aquifer supply wells for both new and existing power plants for major energy utility in South Florida. Included aquifer performance testing, groundwater flow modeling, and unsaturated zone groundwater flow and transport modeling.

Senior Hydrogeologist: Developed estimates of integrated surface water/groundwater modeling costs and assisted in preparation of Statement of Estimated Regulatory Costs (SERC) for proposed SFWMD Picayune Strand and Fakahatchee Estuary Water Reservations.

Senior Hydrogeologist: Assisted South Martin Regional Utilities (SMRU) with consumptive use permitting at its South System Surficial Aquifer wellfield. Developed a calibrated, MODFLOW model to evaluate cumulative drawdown from the SRMU wellfield and nearby existing legal users (ELUs).

Senior Hydrogeologist: Assisted Mock Roos and the City of Lake Worth during the " low rainfall periods of 2006 and 2007 to evaluate potential saline water intrusion from existing wellfield operations. Analysis included evaluation of surficial aquifer water levels and chloride concentrations, review and analysis of wellfield pumpage, water quality and water level data to assess extent of local saline water intrusion indicated from concentration increases in monitoring wells.

Senior Hydrogeologist: Groundwater flow modeling to evaluate safe yield, develop wellfield operating plan, and support SFWMD consumptive use permit modification for agricultural operation in eastern Hendry County.

Senior Hydrogeologist: Developed geochemical and surface-water/groundwater model to assess proposed discharge of effluent from Jupiter nanofiltration water treatment plant (WTP). Evaluated suitability of use for golf course irrigation; effectiveness of providing recharge to municipal wellfield; and potential for adverse environmental impacts.

Senior Hydrogeologist: Assisted Mock Roos and the City of Lake Worth in obtaining a SFWMD CUP for the brackish water supply for a planned reverse osmosis plant; work included development and application of an groundwater flow model to support the Utilities requested allocation and wellfield operational plans.

Senior Hydrogeologist: Performed variable-density groundwater flow and transport modeling to evaluate proposed operations of deep injection wells within Floridan Aquifer System (FAS) for Martin County Utilities.

Senior Hydrogeologist: For numerous projects involving Martin County Utilities Consolidated System, which includes FAS and SAS wellfields. Duties included groundwater modeling to perform impact evaluations in support of consumptive use permit applications; hydrogeologic investigations; aquifer testing; expert witness testimony; design, construction and maintenance of SAS and FAS wells.

JUSTIN VOSS, PE
HYDRAULIC MODELING

Mr. Voss is a registered professional engineer with expertise in hydraulic modeling applications. His specific experience includes water distribution hydraulics, flow and pressure data collection, asset management, water reliability studies, master planning, hydraulic model calibration and analysis, water quality simulations, waterhammer assessment and mitigation, system optimization, and pump evaluation. He is familiar with InfoWater, InfoSurge, and WaterGEMS software.

EXPERIENCE

Water Distribution Master Plan, City of Daytona Beach, FL. Hydraulic Engineer. Converted the City's 6,000 link drinking water distribution model from an engineering consultant's proprietary software to InfoWater. Also, completed an evaluation demonstrating that pressure and water quality data (chlorine concentration) output for the InfoWater model was within a reasonable tolerance of the original model.

Orange Tree High Service Pump Replacement, Collier County, FL. Hydraulic Engineer. Used Collier County's 58,000-link water distribution model to evaluate pumping conditions for the design of high service pumps to replace pumps unable to deliver flow at the required pressures. Alternatives also considered connections to the larger Collier County system and existing and projected build-out demands.

Port Miami Expansion, Miami-Dade County Water and Sewer Department, Miami, FL. Lead Hydraulic Engineer. Utilized the District's 190,000-node extended period simulation model to assess improvements needed to convey up to 25,000 gpm of drinking water to Port Miami to allow for filling the ships in port. Study was initiated because of the planned Port expansion to include more slips and the low pressures that currently occur during ship filling. Model was calibrated for both steady state and extended period flows and pressures. The extended period calibration was performed for a 24-hour period with 100 percent of the time steps for pressure being within 5 psi of the measured and 100 percent of the flow being within 10 percent of the measured. Additional calibration criteria included percentages of time steps within 2 psi for pressure and 5 percent for flow. New conveyance, in the form of a 42-inch water main on the island with twin 30-inch water mains under Biscayne Bay, was recommended. Additional conveyance improvements were recommended between the transmission main and the filling station. Finally, improvements to reduce the energy losses at the filling stations, including more efficient backflow preventers, meters, and valves were used. Up to 4.5 MG of storage was also considered, but not implemented because the client has no other storage facilities in its system. Proposed solution maintained pressures on the island above 50 psi during the peak demand and 35 psi at the filling stations. A water age analysis was also completed and correlated against measured concentration of disinfection byproducts.

Estero Boulevard Phases II-IV Water Main Improvements, Fort Myers Beach, FL. Lead Hydraulic Engineer. Tetra Tech was selected based on our work in the first phase of the design. Used the Town's InfoWater model to size two parallel replacement mains for the

EDUCATION

BSE, Civil Engineering, University of Michigan, 2004

MSE, Civil Engineering, University of Michigan, 2005

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Michigan, #6201056026, Ohio, #77598, Florida, #87245, Indiana, #11900272

YEARS OF EXPERIENCE	14
YEARS WITH ARDAMAN	14

remaining 24,000 feet of the Town's primary water transmission corridor along Estero Boulevard. Model was also used to identify areas of poor pressure and fire flow on 90 side streets with dead end water mains. Model results were used as the basis of design. Many of the 3- to 6-inch diameter mains were recommended for replacement with 8-inch diameter mains. A few larger water mains were recommended to be left in place. Total length of replacement water main in the design was 110,000 feet.

North Estero Boulevard Phase II Side Street Water Main Improvements, Fort Myers Beach, FL. Lead Hydraulic Engineer. Town's InfoWater model was used to identify areas of poor pressure and fire flow on 14 side streets with dead end water mains that were connected in the area of the new 10- and 16-inch transmission water main on Estero Boulevard that were designed in 2015. Model results were used as the basis of design. Many of the 3- to 6-inch diameter mains were recommended for replacement with 8-inch diameter mains. Total length of replacement water main in the design was 20,500 feet.

Estero Boulevard Phase I Water Main Improvements, Fort Myers Beach, FL. Lead Hydraulic Engineer. An InfoWater model maintained by the Town was used to confirm that pressure and fire flow goals would be met with the replacement and consolidation of several smaller water mains into a dual transmission and distribution mains. This was the initial phase of a four-phase project and set the likely water main sizes for future projects.

Burnt Store Road Utilities Plan, Cape Coral, FL. Hydraulic Engineer. Recommendations for the sizes and locations of water and irrigation mains that would cross Burnt Store Road in the long-term future. The recommended sizes were then used to design casing pipe that would be installed under the road as part of project by Lee County to widen the road from 2 lanes to a 6-lane boulevard between Pine Island Road and Gator Slough. Recommendations were based on the potable and irrigation water models used by the City.

Royal Harbor Utilities Expansion, Naples, FL. Lead Hydraulic Engineer. Provided modeling and quality review assistance for a potable water main improvement project. A major design goal was to provide improvements to the fire flow on several dead end streets that extended into the adjacent bay. The model was used to assist the designers in selecting the appropriate water main size and looping locations to reduce the length of the dead end portions of the water main. Bentley's WaterGEMS software was used.

Areas Southwest 6 and 7 Utilities Extension, Cape Coral, FL. Hydraulic Engineer. Assisted design engineers with water distribution and irrigation networks for a 2,400-acre utility expansion project. H2OMap Water and InfoWater software were used to model the two distribution networks. The potable and irrigation models contained more than 38,000 and 13,000 links, respectively.

Belcher Road Water Main Break Investigation, Pinellas County, FL. Quality Review. Technical review of a water distribution modeling alternatives for an investigation of the potential of hydraulic conditions causing water main breaks. Model predicted this pipe had little to no velocity because of a downstream check valve that was almost always closed. Static pressures were at 80 psi. WaterGEMS is the County's selected modeling software. Poor construction quality was determined to be the cause of failure. A replacement water main was recommended for local services and redundancy.

FGUA Reuse (Irrigation) Water Transmission Main Extension, Cape Coral, FL. Hydraulic Engineer. Used the City's 13,000-link irrigation model to evaluate options to expand the utilization of reuse water purchased from FGUA for irrigation from 0.25 to 6.0 mgd. Model was utilized to identify the need for new storage facilities and efficient routes and sizes for transmission main improvements. Proposed storage facility and transmission main will allow the City to reduce water waste and convey the additional water from the isolated section of the City currently supplied by FGUA into the main portion of their system where the full amount can be used. Proper interpretation of the model results found a more optimal point of connection to the existing system that would increase conveyance and pressures.

Irrigation System Model Updates, Gateway, FL. Hydraulic Engineer. Reviewed and updated the Service District's WaterGEMS model to align it with proper coordinate system and current elevation datum used by the City. Matched the model to pressures reported in the 2009. Added 5,000 feet of 16- and 20-inch parallel water main that had been constructed as well as several subdivisions. Following the addition of the newly constructed water mains, pressure maps were created for the peak hour demand to identify areas of concern.

North 1 and North 2 Irrigation Master Plan, Cape Coral, FL. Hydraulic Engineer. Expanded the City's InfoWater model of its irrigation system to the North 1 and North 2 Utility Expansion Program (UEP) areas, which includes 11 square miles and 170 miles of irrigation water main between 4 and 36 inches. Permutations of up to 3 canal pump stations were also evaluated and sized for 50 and 100 percent of build-out with a combined firm capacity of 50 mgd. Master plan deviated from the 2007 city-wide plan to accommodate revised staging of the UEP areas, which would have left portions of North 1 and 2 without a water source. Master plan update addressed that concern by increasing the size of strategic water mains and evaluating the size and location of the canal pump stations. Also provided a review of the design of the North 1 and 2 irrigation system completed by another consultant.

BANKS R. WASON, PE
ELECTRICAL AND INSTRUMENTATION

Mr. Wason has eleven years of years of experience in electrical engineering. His experience includes the design of new and modification of existing medium and low voltage power distribution, standby power systems, grounding infrastructure, SCADA systems, interior and exterior lighting, fire alarm, telecommunications, and security systems.

EXPERIENCE

Central Water Integration Project (CWIP), San Antonio Water System, TX. Electrical Engineer. Responsibilities include the design and specification of medium and low voltage power distribution, standby power system, instrumentation and PLC control system for a 48.0 MGD water treatment system. Project consists of treatment facilities, conveyance pipelines, and improvements to existing pump stations and distribution facilities to integrate a new 48.0 MGD potable water supply source into the utility's potable water distribution system. The supply source for this project consisted of a $900 million P3 water supply project that will import groundwater from a wellfield that is 140 miles from the City of San Antonio. The designed treatment facilities include pressurized solution injection of carbon dioxide for pH adjustment, lime storage and batch slaking, lime saturators (solids contactors) for calcium remineralization, dual media pressure filters, a sodium hypochlorite on-site generation system, fluoride storage and feed, backwash recovery, filtered solids and lime sludge gravity thickener, sludge handling and dewatering using centrifuges, and associated polymer storage and feed systems.

Groundwater Replenishment Advanced Water Purification Plant, City of Clearwater, FL. Electrical Engineer for the design, permitting, and bidding of a 3.0 MGD water purification plant. The plant receives reclaimed water, provides membrane treatment via ultrafiltration and reverse osmosis and oxidation potential control through UV treatment and hydrogen peroxide addition. Mr. Wason designed the normal power distribution, instrumentation and SCADA system for the treatment plant. Mr. Wason also designed the power, lighting, fire alarm and security systems for the associated administrative and training building.

Cypress West Water Reclamation Faculty Upgrade and Expansion, Toho Water Authority, FL. Project Electrical Engineer for the expansion of the Cypress West WRF facility from 3.0 MGD to 6.0 MGD. Design, permitting and construction administration services for the referenced project. Mr. Wason worked closely with Toho Water personnel to coordinate the seamless integration of three existing electrical services to a single service location with a common standby power system. This work took place while the plant was in full operation. In addition, Mr. Wason designed a new electrical service and standby power system for the plant expansion, including a new hypochlorite-based disinfection system and contact basin, new disk filters, 15 MG of additional reclaimed water storage and a high service pump station. Mr. Wason oversaw the integration of the new SCADA equipment with the existing plant SCADA system.

Northwest Water Reclamation Facility Expansion, Garney Construction, Hillsborough County, FL. Electrical Engineer for the expansion of the NWR WRF from a capacity

EDUCATION

BS, Electrical Engineering, Minor: Physics, Florida State University, 2006

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida #73973,North Carolina #041312, Alabama #34925

YEARS OF EXPERIENCE	11
YEARS WITH TETRA TECH	4

of 10.0 MGD to a capacity of 30 MGD. Project responsibilities include design, permitting and construction support for the plant expansion. Designed the power distribution for the plant expansion which includes two 4000A, 480V drawout switchgear lineups; each gear lineup utilizes a Main-Tie-Main configuration and is supplied by fully redundant utility service. The standby power system for the plant expansion includes three 3MW diesel generators; two generators are duty units with the third as a standby. Designed the plant instrumentation and SCADA system. This system integrates the existing plant (10.0 MGD) and the expansion (20.0 MGD) into one cohesive plant.

Coppermine Headworks Improvement Project, Paulding County, GA. Project Electrical and Instrumentation Engineer for the headworks improvement project. Upgrades include the installation of two new influent drum screens and the replacement of the existing odor control system. The project upgrades will take place in an active waste water treatment plant without any loss of service. In addition to power distribution, Mr. Wason designed the interface between the new equipment and the existing plant SCADA system.

Malcolm Road Water Supply Facility (WSF), Orange County Utilities, FL. Electrical Engineer for the design, permitting and construction of a 7.6 MGD greenfield potable water treatment facility. The project includes development of a 64-acre site that is situated near a large scale rapid infiltration basin system. The treatment facility will consist of six lower Floridian aquifer supply wells, two 2.0 MG ground storage tanks, a high service pump system within a treatment facility building, and related chemical storage and feed facilities. Mr. Wason designed the plant power systems, including medium and low voltage normal and standby power systems. Mr. Wason also designed the plant instrumentation and control systems, as well as a link to the county master SCADA system.

4.0 MGD Reverse Osmosis Water Treatment Plant, City of Punta Gorda, FL. Electrical Engineer. Services provided for the project include final design, permitting, and construction administration for the 4.0 MGD (expandable to 8.0 MGD) reverse osmosis treatment facilities. The proposed improvements include conversion of two existing ASR wells to be used for reverse osmosis supply wells and construction of an on-site deep injection well. The proposed RO treatment facilities will be located on undeveloped land at the existing surface water treatment plant site.

Milk River Intercounty Drainage District Improvements, Wayne County, MI. Electrical and Instrumentation Engineer for the final design phase of this project. This project consisted of upgrades to the Milk River Pump Station and Combined Sewer Overflow Retention Treatment Basin and the Milk River Recirculation System. As a program requirement, the facility was required to maintain services throughout the duration of the project. Mr. Wason's role of project electrical engineer included design and specification related to the following tasks:

- Replacement of medium voltage switchgear.
- Replacement and addition of select low voltage electrical distribution components.
- Rebuild the 1750HP, medium voltage storm pumps.
- Improve grounding infrastructure and surge protection of facilities.
- Replace disinfection system.
- Upgrade sanitary pump station.
- Modify and replace groundwater, flushing, and dewatering pumps.
- Upgrade basin flushing system.
- Replace outdated lighting with LED fixtures. Update lighting controls.
- SCADA system upgrades including:
  - Integration of system with Wayne County SCADA system.
  - Replacement of control panels and replacement of components within control panels to comply with current Wayne County standards.
  - Provide additional instrumentation for increased facility automation.

Hunters Hill Hamlet Community Water System, Loudoun County, VA. Project Electrical Engineer for design of a community water supply and treatment system for Hunters Hill Hamlet, a new residential community development. Responsibilities included the design and specification of the following systems:

- Power distribution for water supply building, treatment facility and remote well locations.
- Standby power system for critical loads consisting of generator located within the water supply building and remote fuel storage.
- Grounding system for water supply building, treatment facility and remote well locations.
- Master labeled lighting protection system for the treatment facility.
- Building and site lighting and lighting controls.
- SCADA system including: Main control panel in water supply building integrated with Loudoun Water SCADA system; Control panels at remote well locations. Communication with main control panel provided via underground fiber optic network; Instrumentation as required for automated operation of pumping and treatment facilities.

JENNIFER "BROOK" WOOD
SFWMD & FDEP PERMITTING

Ms. Wood is a project hydrogeologist and has participated in projects regarding several aspects of water resources and environmental oversight. She is experienced with well construction design, drilling oversight for public supply and monitoring wells, aquifer performance testing, data collection and analysis (including water quality, lithology, and geophysical and video well logs), plumbness and alignment testing, consumptive use permitting/water use permitting (for the St. Johns, Southwest, and South Florida Water Management Districts), and experience in permit application submittal and report preparation.

EXPERIENCE

Tohopekaliga Water Authority, NED Sunbridge Water Use Permit, Osceola County, FL. Preparation of a new water use permit application for public supply use in the South Florida Water Management District.

Charlotte Harbor Water Association Well No. 6 Replacement, Punta Gorda, FL. Well design, bidding, and construction oversight for one Upper Floridan aquifer replacement well, including lithographic descriptions, aquifer performance testing, data collection and analysis, report preparation of construction and testing activities, and preparation of a modification and approval on the water use permit within the Southwest Florida Water Management District.

City of Deltona Well No. 48 Replacement, Deltona, FL. Well design, bidding, and construction oversight for one Upper Floridan aquifer replacement well, including lithographic descriptions, aquifer performance testing, data collection and analysis, report preparation of construction and testing activities, and preparation of a modification and approval on the water use permit within the St. John's River Water Management District.

Tohopekaliga Water Authority, STOPR and Poinciana Water Use Permit, Osceola County, FL. Preparation, submittal, and approval of a water use permit modification application for public supply use in the South Florida Water Management District.

Sunburst WTP Lower Floridan Aquifer Exploratory Test Wells, City of Clermont, FL. Well construction oversight for two Lower Floridan aquifer wells, including lithographic descriptions, aquifer performance testing, data collection and analysis, submittals to SJRWMD and FDEP for funding assistance, report preparation of construction and testing activities, and preparation of a modification to the City's water use permit within the St. Johns River Water Management District.

City of Punta Gorda Deep Injection Well, City of Punta Gorda, FL. September 2016 – October 2017. Well construction oversight for one injection well and one dual zone monitoring well, including lithographic descriptions, aquifer performance testing, pressure testing, data collection and analysis, and submittals to FDEP for funding assistance including assistance with Davis Bacon requirements and the American Iron and Steel Compliance. Preparation of the well construction and mechanical integrity testing report with approval for the project from FDEP.

EDUCATION

B.S., Geology, University of Florida, 2005

REGISTRATIONS/ CERTIFICATIONS

40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Training – September 2006

8-hour OSHA HAZWOPER Refresher – February 2019

Standard First Aid Training and CPR, 2018

FDOT Maintenance of Traffic, Restricted, #2946

YEARS OF EXPERIENCE	14
YEARS WITH TETRA TECH	14

Shell Creek Wellfield Exploratory Test Wells, City of Punta Gorda, FL. Shell Creek Wellfield: well construction oversight for one surficial aquifer well, two Upper Floridan aquifer production wells, and one tri-zone monitor well (PZ-3, UFA production zone, & UFA Suwannee monitoring zone) lithographic descriptions, aquifer performance testing, data collection and analysis, report preparation of construction and testing activities, and preparation and approval of a modification to the City's water use permit within the South Florida Water Management District.

Cypress Lake Wellfield Exploratory Test Wells, Tohopekaliga Water Authority, FL. Cypress Lake Wellfield: well construction oversight for three surficial aquifer wells, two Upper Floridan aquifer wells, six Lower Floridan aquifer wells, one dual zone monitor well (in the Avon Park permeable zone and Lower Floridan aquifer), and one tri-zone monitor well (in the Avon Park permeable zone and Lower Floridan aquifer) lithographic descriptions, aquifer performance testing, data collection and analysis, report preparation of construction and testing activities, and preparation and approval of an alternative water supply water use permit within the South Florida Water Management District.

Exploratory Test/Production Wells, City of Everglades City, FL. June 2010 – January 2011. Well construction oversight for two Gray Limestone aquifer wells, including lithographic descriptions, water quality testing, aquifer performance testing, geophysical logging, and report preparation of construction and testing activities.

City of Naples Water Use Permit, Naples, FL. Preparation and approval of a water use permit renewal application for public supply and alternative water supply uses in the South Florida Water Management District.

Parkway Production Well No. 4, Tohopekaliga Water Authority, FL/ Construction oversight, lithographic descriptions, plumbness and alignment testing, aquifer performance testing, data collection and analysis, and report preparation of construction and testing activities.

Aquifer Storage and Recovery Feasibility Study, Canaveral Port Authority, FL. Aquifer performance testing, data collection and analysis, and groundwater sampling for one aquifer storage and recovery well and four surficial aquifer monitoring wells. Report preparation for all three phases of the associated cycle testing of the injection and storage of potable drinking water within the surficial aquifer.

JEA Wellfield Expansion Public Supply Wells, City of Port St. Lucie, FL. Well construction oversight for nine Floridan aquifer wells, including lithographic descriptions, plumbness and alignment testing, water quality testing, aquifer performance testing, geophysical logging, and report preparation of construction and testing activities.

Combee Water Treatment Plant Public Supply Well, City of Lakeland, FL. Well construction oversight for one Upper Floridan aquifer well, including lithographic descriptions, water quality testing, aquifer performance testing, geophysical logging, and report preparation of construction and testing activities.

Public Supply Well No. 10, City of Plant City, FL. Well construction oversight for one Upper Floridan aquifer well, including lithographic descriptions, water quality testing, aquifer performance testing, geophysical logging, and report preparation of construction and testing activities.

AMAL YELKUR, EI
ELECTRICAL AND INSTRUMENTATION

Mr. Yelkur has 20 years of experience with providing and overseeing SCADA and instrumentation I&C engineering services to clients throughout the U.S. and Florida. He has provided the start-up of instruments, process systems and HMI systems and as well as development and check out of the control logic on SCADA systems. He has designed and installed I&C/ SCADA systems for WTPs, WWTPs, Integrated Traffic Systems and other industrial facilities such as oil, solar and pharmaceutical companies.

EXPERIENCE

Central Water Integration Project, San Antonio Water System, TX. Instrumentation & Controls Engineer. Project consists of treatment facilities, conveyance pipelines, and improvements to existing pump stations and distribution facilities to integrate a new 48.0 MGD potable water supply source into the utility's potable water distribution system. The supply source for this project consisted of a $900 million P3 water supply project that will import groundwater from a wellfield that is 140 miles from the City of San Antonio. The designed treatment facilities include pressurized solution injection of carbon dioxide for pH adjustment, lime storage and batch slaking, lime saturators (solids contactors) for calcium remineralization, dual media pressure filters, a sodium hypochlorite on-site generation system, fluoride storage and feed, backwash recovery, filtered solids and lime sludge gravity thickener, sludge handling and dewatering using centrifuges, and associated polymer storage and feed systems.

Malcolm Road Water Supply Facility, Orange County Utilities, FL. Instrumentation & Controls Engineer. Design of an 8.64 MGD greenfield potable water treatment facility. The project includes development of a 64-acre site located near a large-scale rapid infiltration basin system. The treatment facility will consist of six lower Floridan aquifer supply wells, two 2.0 MG ground storage tanks, a high service pump system within a treatment facility building and related chemical storage and feed facilities. The facility site planning and treatment facilities are master planned for future expansion to a capacity of up to 19 MGD.

Shell Creek 4.0 MGD Reverse Osmosis Water Treatment Plant, City of Punta Gorda, FL. Controls Discipline Lead Engineer for the pilot testing, final design, permitting, and construction administration for the proposed 4.0 MGD expandable to 8.0 MGD reverse osmosis treatment facilities. The proposed improvements include conversion of two existing ASR wells to be used for RO supply wells and construction of an on-site deep injection well. The proposed RO treatment facilities will be located on undeveloped land at the existing surface water treatment plant site.

Water Treatment Plant No. 1 Improvements, City of Clearwater, FL. Instrumentation & Controls Discipline Lead Engineer for the reverse osmosis improvements at Water Treatment Plant No. 1.

EDUCATION

Bachelor of Technology, Civil Engineering, G. Pulla Reddy Engineering College, Kurnool, AP, India, 1999

Courses taken toward: MS, Environmental Engineering, South Dakota State University

REGISTRATIONS/ CERTIFICATIONS

Engineering Intern, South Dakota, E-9949 (June 19, 2006)

Construction Document Technician (CDT) April 2010 to Present

YEARS OF EXPERIENCE	20
YEARS WITH TETRA TECH	3

Storm and Surface Water Augmentation to Reduce Ground Water Demands for Irrigation at the Alexander Avenue Water Management Site, Deltona, FL. Project Manager. The proposed treatment facilities at the Alexander Avenue Water Management Site has been designed to treat up to 4.0 MGD average annual daily flow stormwater, and in the future, surface water to comply with Florida Department of Environmental Protection (FDEP) public access reuse standards. The overall project (Project 4A and 4B) generally includes a surface water intake and pump station on Lake Monroe, 24-inch transmission main to the Alexander Avenue Water Management Site, storage for raw surface water and stormwater, treatment consisting of coagulation and flocculation pretreatment, sedimentation, filtration, disinfection, and finished water storage. This project has been funded by FDEP and St. John's River Water Management District grants and SRF loan. This innovative project of treating storm water and surface water to public access reuse standards had been selected to present at conferences.

South East Regional Water Treatment Plant, Seminole County, FL. Lead Designer for the I&C and communication systems for the new Ozone WTP facility. The design includes a plant-wide process monitoring and control system to support automation of the Ozone Generator and treatment system including construction support for factory acceptance testing, loop checkout, HMI screen development, security and network testing.

Country Club Water Treatment Plant, Seminole County, FL. Lead Designer for the I&C and communication systems for the new Ozone WTP facility. The design includes a plant-wide process monitoring and control system to support automation of the Ozone Generator, Granular Activated Carbon and chemical feed treatment system including construction support for factory acceptance testing, loop checkout, HMI screen development, security and network testing.

SCADA I&C System, Hillsborough County Water Resource Services, FL. Reviewed PLC, Control panels, Radio System applications, process instrumentation & control systems for lift stations throughout Hillsborough County-SCADA. Prepared specifications and designed panel layout drawings with bill of materials, instrument locations for Contractor bidding. Performed cost estimating for bid proposals and inspection during control panel-factory acceptance testing.

Valrico Advanced Water Treatment Plant Construction, Hillsborough County, FL. Project Startup Engineer for the control systems and process instrumentation for the plant expansion. Responsibilities included startup of instruments, process systems and HMI systems and check out of control logic programming in the PLCs. The plant expansion included a UV disinfection system, oxidation ditches with surface aerators, clarifiers, RAS pumps and new effluent and intermediate transfer pumps.

Cypress Creek Water Treatment Plant, Tampa Bay Water, FL. Lead Designer for the instrumentation and controls and communication systems for the interim plant upgrade. The design includes a chemical feed system upgrade with control panels for communication with SCADA.

Water Master Plan, City of Tallahassee, FL. Developed a water master plan for the City of Tallahassee to identify needed SCADA distribution system improvements and water supply alternatives. Key elements of the plan included identification of distribution expansion alternatives with latest technology and development of a downtown infrastructure replacement program.

Burnt Store Water Treatment Plant Expansion - Wellfield Maintenance, Charlotte County, FL. Project engineer to rehabilitate three groundwater wells which included design and installation of flow meters, well monitoring devices. Assisted in systems design, shop drawing review and responses to RFIs.

WFP Filter Design, Birmingham Water Works Board, AL. Developed conceptual designs and technical memos on filter control upgrades. Designing instrumentation and controls to retrofit the existing water plant's filter control system. The retrofit also involves backwash system and air scour blowers as an upgrade to the plant's existing distributed control system.

Wyckoff SCADA, Cobb County-Marietta Water Authority, GA. Project Engineer on the designing of the Design-Build conceptual specifications and drawings for a new SCADA system at the 72-mgd Wyckoff Water Treatment Plant. The project included reviewing the contractor submittals; provide modifications to meet the client needs.

CDA-Shaft 4 CAT, New York City DEP, NY. Lead Designer for the instrumentation and controls and communication systems for the interim plant upgrade to the 275-mgd plant. The design includes a plant-wide process monitoring and control system to support automation of the water distribution system.

Lewis & Clark Distribution System, Vermillion SD. Designed Lewis & Clark WTP pump stations for Lewis & Clark Rural Water System, SD. Involved 16 pump stations 60 MGD pumping capacity, covering three States – Iowa, SD & Minnesota. Evaluated Integrators and suppliers to meet LCWRS criteria. Project included telemetry, Instrumentation and local PLC control based network. Coordinated and assisted Electrical, Utility (Power), and Process teams, with cost estimates, addendums, RFIs, and RFPs, including change orders during bidding services.

Watertown Lift Station, Watertown SD. Designed PLC, DCS, SCADA-HMI applications, process instrumentation & control systems for 35 lift stations. Prepared specifications and P&ID drawings with I/O and control panel layouts, instrument locations, and logic diagrams for bidding. Performed inspections, startup, and commissioning of I&C systems, approved pay requests. Prepared sequence and theory of O&M manuals for lift station equipment.

MICHAEL YOST, PE, SE, LEED AP BD+C
STRUCTURAL ENGINEERING

Mr. Yost has more than 44 years of experience in project management and the structural design of all types of building and infrastructure projects in the commercial, government, municipal, and military arenas. Projects include: educational facilities, recreational facilities, churches, medical and research facilities, office buildings, postal facilities, historic renovation projects, riverfront and park projects, parking garages, bridges, military projects, industrial facilities, and water and wastewater treatment facilities.

EXPERIENCE

Louisville Water Company Roof Evaluations, Louisville, KY

- **Evaluation of deteriorating concrete in filter building roof at BE Payne Water Treatment Plant.**
- **Evaluation of the roof structure of an existing building prior to reproofing at the Crescent Hill Water Plant.**

Louisville Water Company Crescent Hill Water Treatment Plant, KY. North-South Filter Building- Structural evaluation of the condition of a 64,000-SF building with steel trusses and timber framing. Recommendation of procedures of repair for deteriorated framing and preparation of cost estimates of repairs. Prepared Contract Documents for the repair work.

Condition Assessment - Louisville/Jefferson County Metropolitan Sewer District Facilities, Louisville, KY. Review and report on the condition of all MSD buildings at each Louisville area facility. The inspection involved a comprehensive review of architectural, structural, mechanical, electrical features within the buildings. A report was prepared that identified the maintenance items to be addressed and assessed prioritization and estimated costs.

State-wide Condition Assessment – Louisville Gas & Electric Facilities, KY. Conducted a condition assessment review of all facilities owned by the Louisville Gas & Electric Company. Prepared a written report of findings; the report identified found deficiencies, prioritized repair needs, and provided an estimate of anticipated repair costs.

Water/Wastewater Plants: Mr. Yost has provided structural design, QAQC review, and construction administration services for many new water and wastewater plants and the renovations/upgrades of existing plants:

Guntersville Dam Water Treatment Plant (WTP) Design and Construction Administration, Huntsville Utilities, Huntsville, AL. QA/QC reviewer for the structural design of the design and construction management of a new 24-MGD surface WTP with a new river bank raw water intake structure located on the Tennessee River's Guntersville Reservoir. The water plant includes a combined flocculation, filter, control / chemical building, a wash water recovery basin, finished water storage and pump station, generator building,

Cape Coral RO WTP Plant, Lee County, FL. Structural design of a renovation project at RO #2 building. Renovation included hardening the structure for 150 mph wind loading with a 1.15 importance factor.

EDUCATION

MS, Civil Engineering, University of Kentucky, 1975

BS, Civil Engineering, University of Kentucky, 1973

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #63658, Ohio, #54847, Indiana, #8802438, Alabama, #15945, Kentucky, #10615 (Structural) Kentucky, #10615

YEARS OF EXPERIENCE	44
YEARS WITH TETRA TECH	30

Cape Coral RO WTP Plant, Lee County, FL. Structural design of a new maintenance warehouse facility. New construction includes hardening for 150 mph wind loading with a 1.15 importance factor.

Lynn Haven WTP, Bay County, FL. Structural QAQC reviewer for a pump house renovation project at water treatment plant. Renovation included the addition of an office, laboratory, electrical room and a pump room within an existing building.

BGAD, WWTP Upgrades, Bluegrass Army Depot, KY. Structural design for a new clarifier, blower building, UV system, and drying beds as part of their renovation

Sellersburg Wastewater System Improvements, Sellersburg, IN. Structural design and calculations relating to a new fine screen, two additional 55-foot-diameter clarifiers with RAS/WAS pumping improvements, ultraviolet disinfection, and high flow diversion tank.

East Lake Wastewater Treatment Plant (WWTP) Improvements, Guntersville, AL. Structural design and calculations relating to the two-phased expansion of a 4.6 MGD WWTP to a 9.0 MGD to meet future service growth and NPDES permit limitations. Structural aspects involved a new headworks facility, demolition of aeration system and replacement with fine bubble tube system, automatically (dissolved oxygen sensor) controlled blower system, new centrifuge sludge dewatering system, and related septage receiving facilities.

Deerfield-Hamilton Water Treatment Plant and Wellfield Expansion and Upgrade, Warren County, OH. Structural engineering recommendations, calculations, detailed plans, specifications, and bid documents relating to the expansion/upgrade of a wellfield and existing 6.0 MGD iron/manganese removal treatment plant to 9.0 MGD, with provisions for future expansion to 12.0 MGD.

Cincinnati Eastern Avenue Water Main Design, Cincinnati, OH. Design of shoring for deep pit.

Cincinnati Delta Avenue, Columbia Parkway Water Main Design, Cincinnati, OH. Design of modifications to a caisson-supported concrete retaining wall being penetrated by new water main.

Hardinsburg Wastewater Treatment Plant, Hardinsburg, KY. Design of a 0.732 MGD activated sludge plant. Structural design included operations building, influent pump station, combination aeration basin and clarifier, chlorine contact tank/aeration ladder, sludge holding tank, and miscellaneous flow boxes.

Additional Water/Wastewater Treatment Plants (WTP / WWTP):

- **Aldridge Creek WWTP, Huntsville, Alabama**
- **Bardstown Actiflo WTP, Bardstown, KY**
- **Berea WWTP, Berea, KY**
- **Big Cove WWTP, Huntsville, AL**
- **Buckner WWTP, Buckner, KY**
- **Butler WWTP, Butler, IN**
- **Charlestown WWTP, Charlestown, IN**
- **Chase WWTP, Huntsville, AL**
- **Danville WTP Improvements, Danville, KY**
- **Findlay WWTP Expansion, Findlay, OH**
- **Frenchburg WWTP, Frenchburg, IN**
- **Garrett WWTP, Garrett, IN**
- **Georgetown WWTPs #1& #2, Georgetown, KY**
- **Grayson WWTP, Grayson, KY**
- **Greenville WWTP, Greenville, KY**
- **Hanover WWTP, Hanover, IN**
- **Henderson WWTP, Henderson, KY**
- **Hite Creek WWTP, Louisville, KY**
- **Jeffersonville WWTP, Jeffersonville, IN**
- **Kokomo WWTP, Kokomo, IN**
- **Lower Little Miami WWTP, Warren Co, OH**
- **Martin County WTP**
- **Morris Forman Phase D Process Improvements, Louisville, KY**
- **Morris Forman WWTP, Bioroughing Tower reconstruction, Louisville, KY**
- **Morehead WWTP, Morehead, KY**
- **Nicholasville WWTP, Nicholasville, KY**
- **North Vernon WWTP – Belt Filter Press and Combined Sewer Overflow Screen System, North Vernon, KY**
- **Paris WWTP, Paris, KY**
- **Redstone Arsenal WWTP, AL**
- **Richmond WTP Improvements, Richmond, KY**
- **Stanton WWTP, Stanton, KY**
- **West Hickman Creek WWTP Expansion, Lexington, KY**

CHRISTOPHER ZAVATSKY, PE
CIVIL ENGINEERING

Mr. Zavatsky serves as Group Leader and Lead Technical Engineer for Tetra Tech's Water, Environment and Infrastructure Division in Miami, Florida. He is responsible for growing and mentoring a group of engineers to produce studies, evaluations, utility planning, modeling, design, specifications, estimates, engineering permits, and construction administration services for the procurement and construction of water utilities. Mr. Zavatsky's project experience encompasses environmental site assessments; soil and groundwater remediation; wellfield protection, consumptive use permits, water treatment and wastewater pre-treatment systems; water and wastewater pump stations and transmission lines; site planning; earthwork; drainage systems; paving and grading; erosion control/stormwater pollution prevention; and signing and pavement marking. Mr. Zavatsky is a licensed professional engineer in the State of Florida and holds two Bachelor degrees in Architectural Engineering and Civil Engineering from the University of Miami. He is also experienced with ArcGIS, AutoCAD Civil 3D, AutoTurn, Cascade, HydroCAD, ICPR, Microsoft Project, and StormCAD.

EXPERIENCE

Water Reuse Feasibility Study, Miami-Dade County, FL. Tetra Tech evaluated the feasibility of water reuse in Miami-Dade County identifying the constraints and opportunities for reuse; established the level of treatment and possible infrastructure needed for various reuse scenarios; identified potential reuse projects and provides estimates of reuse volumes. Mr. Zavatsky lead the cost estimating efforts to reuse up to 117.5 MGD per Ocean Outfall Legislation (OOL) from 4 water reuse plants.

WTP Hurricane Hardening: Filter and High Service Pumps 1-4 Building with Exterior Tanks, Chemical Feed Building, Sludge Dewatering Building, and Membrane Building, City of Pompano Beach, FL. Project Manager. This project includes engineering services to prepare design documents for the identified hurricane hardening elements at the Pompano Beach Water Treatment Plant, based on Tetra Tech's Hurricane Hardening Study completed in June 2016. Specifically, Tetra Tech provided design documents and other engineering services for the identified improvements.

Costa Farms – Water Use Permitting, Miami-Dade County, FL. Mr. Zavatsky lead review and renewal of water use permits with the South Florida Water Management District for irrigating scores of properties used for plant farming.

School Board of Broward County Continuing Contract Services, Broward County, FL. Services being provided to schools include: Phase I & II Environmental Site Assessments, environmental permitting, lift station design, recreation and playground areas, bus facility parking upgrades, water, sewer, paving and drainage design, construction documents and monitoring, tank closures, contamination assessments, wetland delineation, mitigation monitoring, maintenance coordination, and permit compliance.

Miami-Dade County Public Schools (M-DCPS) Miami Norland Senior High School – Partial Replacement, Miami Gardens, FL. Coordinated efforts with local regulatory to design and permit water and sewer extensions within the 10-day wellfield for the Norwood-Oeffler Water Treatment Plant for a major overhaul of the Miami Norland Senior High School. The design required a new gravity sanitary system, pump station and force main connecting to the public utility owned by the City of North Miami Beach. Fire improvements were made to the surrounding neighborhood with the addition of five fire

EDUCATION

BS, Civil Engineering, University of Miami, 2007

BS, Architectural Engineering, University of Miami, 2007

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida, #76885

YEARS OF EXPERIENCE	12
YEARS WITH TETRA TECH	3

hydrants and aged water main pipes were removed. Project Role: Project Manager / Engineer of Record

Miami International Airport Fuel Facility Tank 21 Water Supply, Miami-Dade Aviation Deparment, FL. Project Manager. Pursuant to a request by the Miami-Dade Fire Rescue (MDFR), Tetra Tech is delivering construction documents and permits to convert Tank 21 at the Fuel Facility into a supplemental water supply for the fire protection system. This involves review and coordination of existing tank and cathodic protection, fire protection system, providing geotechnical explorations, structural analysis, and civil design to bring Tank 21 to service for the fire department. A new filling hydrant will provide an alternate source of water for equipment and fire trucks, minimizing the draw on the public water system.

Water Master Plan, Miami International Airport, Miami-Dade Aviation Department (MDAD), FL. Project Engineer / Deputy Project Manager. Mr. Zavatsky started this project serving as a project engineer to update records and CAD drawings on all potable and fire water mains within the Miami International Airport's Public Water System (PWS). This project included water master planning services for all Miami-Dade County aviation facilities to include new water system mapping, regulatory review and requirements, historical and projected water demands evaluations, and hydraulic modeling to identify existing system deficiencies and future capital improvements. In 2016, Mr. Zavatsky was assigned as Deputy Project Manager.

Pump Stations D-10 and D-11 Flow Analysis and Redesign Project, City of Ft. Lauderdale, FL. Assistant Engineer. Wastewater flow analysis due to increased land use densities from single family to condo and multifamily uses and evaluation of existing duplex pump stations and upstream influent manholes for rehabilitation or replacement for two existing city pump stations located adjacent to East Las Olas Blvd. on the Isle of Venice (pump station D-10) and Hendricks Isle (pump station D-11). Preparation of preliminary design memorandum with findings and recommendations for rehabilitation and replacement and associated costs, and survey, design, permitting and construction administration services for the rehabilitation and removal and replacement of existing infrastructure in disrepair. The pump stations both have 6-inch force mains (FMs) that discharge into an existing gravity sewer system on East Las Olas Blvd. The material for the FMs will also be verified via subsurface utility excavations with recommendations being made for potential FM removal and/or replacement.

NPDES Report, Village of Key Biscayne, FL. Responsible for preparation of annual National Pollutant Discharge Elimination System (NPDES) reports, submittal to Miami-Dade County DRER and FDEP; assist in reapplication; and responding to comments from FDEP.

CRS Program Verification, Village of Key Biscayne, FL. Project manager providing a list of on-going Village activities associated with maintaining compliance with the requirements of the NFIP CRS program. Professional services associated with the scope of work. This is an on-going scope and responsibilities include assisting Village CRS Coordinator with preparation of Annual Recertification report; review and revision of flood prevention ordinances; review of elevation certificates; resolution of non-complying properties; coordination with ISO and FEMA; response to ISO and FEMA CAV and Verification Visit comments; represent the Village at CRS User Group meetings and Miami-Dade County Local Mitigation Strategy meetings; analysis of CRS activities to maximize credits; establish, implement and update building permitting and inspection standard procedures and policies.

Design-Build Services for SR 874 Ramp Connector to SW 128th Street (Contract No. RFP-15-02), Miami-Dade Expressway Authority (MDX), FL. Engineer of Record for Water and Wastewater. As part of a Design-Build Team, Mr. Zavatsky served as the utility engineer of record for the design and construction of the MDX Ramp Connectors from SR 874 (Don Shula Expressway) to SW 128th Street between the SR 821 (Homestead Extension of Florida's Turnpike) to west of SR 825/SW 137th Avenue. The new ramp connectors will provide access to and from the Don Shula Expressway (SR 874) and SW 128th Street at SW 122nd Avenue extending SR 874 west from its current terminus at the Homestead Extension of Florida's Turnpike (HEFT) (approx. 0.5 mile). Scope involves working directly with the Miami-Dade County Water and Sewer Department to relocate 24 fire hydrants; 700 linear feet of 12-inch diameter water main with domestic and fire services to adjacent properties; and 700 linear feet of gravity sewer main with lateral services.

Lake Estates Small Water Main Improvements, City of Fort Lauderdale, FL. Engineer of Record. Surveying, utilities verification, and geotechnical investigations to design and permit approximately 10,850 linear feet of 8-inch diameter PVC and DIP water mains to replace existing aged water mains. Permitting involved the Florida Department of Health, Broward County Environmental Protection and Growth Management Department, and Florida Department of Transportation. The project also required preparation of design and construction documents, bidding review and assistance, construction administration and inspection, and project closeout and certification.

South Roosevelt Boulevard/SR A1A from MP 0.000 to MP 0.778, City of Key West, FL. Engineering design for the reconstruction of SR A1A, a 4-lane undivided road running along the southern coast of Key West along Smathers Beach. Mr. Zavatsky was responsible for the development of the lighting and drainage systems. Major project feature included the design of a drainage system that would minimize impacts on environmentally sensitive coastal waters, permitting for that system, extensive regulatory agency coordination and the use of decorative lighting fixtures for roadway and pedestrian lighting. Project Role: Project Engineer/Engineer of Record.

DAN ZRALLACK, PE
GEOTECHNICAL
ARDAMAN & ASSOCIATES, INC. (A TETRA TECH COMPANY)

Mr. Dan Zrallack has provided professional geotechnical engineering services to municipalities, water and wastewater utilities, engineering companies, and private industry for 22 years. Dan has been with Ardaman since 1997 and has worked as an engineer in Ardaman's Orlando, Cocoa, Port St. Lucie and West Palm Beach offices. His experience is unique in that he began his career as a field technician/inspector and gained significant experience regarding field testing and inspection of soils, concrete, asphalt and other construction materials. He has worked on numerous projects involving geotechnical engineering and construction materials testing and inspections, some of which are highlighted below.

EXPERIENCE

SFWMD EAA A-2 Reservoir Project, Hendry County, FL. Mr. Zrallack was the project manager and senior geotechnical engineer for the Geotechnical Site Characterization report on the proposed SFWMD Everglades Agricultural Area (EAA) A-2 Storage Reservoir in southwestern Palm Beach County. The project is being considered to reduce high-volume freshwater discharges from Lake Okeechobee into the Northern Estuaries. The A-2 reservoir will provide up to 240,000 acre-feet of above ground storage (consisting of a ground storage depth of about 23 feet contained by new perimeter earthen dam) and (combined with the proposed A-2 STA, west of the reservoir component) provide the necessary treatment and discharge to help improve flows to the Everglades system.

C-24 Canal Bank Stabilization Project, St. Lucie County, FL. Mr. Zrallack was the project manager for quality assurance testing services for this canal bank stabilization and erosion protection project along the C-24 Canal between Shinn Road and Glades Cut-Off Road in western St. Lucie County. The project included the installation of riprap revetment and roadway improvements along the western side of the C-24 Canal.

Header Canal Bank Stabilization Project, St. Lucie County, FL. Geotechnical engineering analyses for approximately three miles of canal bank along Header Canal Road between State Road 70 and Goldsmith Road, which included an investigation of existing canal bank slope failures, slope stability analyses and stabilization design to provide for global stability and long-term performance of the canal banks. Ardaman also provided quality control testing and inspection services during construction to assure successful implementation of the design.

Five Mile Creek Canal Bank Stabilization Project, St. Lucie County, FL. Mr. Zrallack was the senior project engineer for geotechnical engineering analyses for approximately two miles of canal bank along Five Mile Creek at the Bent Creek Subdivision, south of Orange Avenue, which included an investigation of existing canal bank slope failures, slope stability analyses and stabilization design to provide for global stability and long-term performance of the canal banks. Ardaman also provided quality control testing and inspection services during construction to assure successful implementation of the design.

Fort Pierce Farms WCD, Canal No. 1 Bank Stabilization, St. Lucie County, FL. Geotechnical engineering analyses for approximately two miles of canal bank between

EDUCATION

B.S. Civil Engineering, University of Central Florida, 2000

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, Florida #63911

YEARS OF EXPERIENCE	22
YEARS WITH TETRA TECH	22

25th Street and Keen Road, which included an investigation of existing canal bank slope failures, slope stability analyses and stabilization design to provide for global stability and long-term performance of the canal banks. Ardaman also provided quality control testing and inspection services during construction to assure successful implementation of the design.

Kissimmee River Lock Structure S-65 Rehabilitation, Osceola County, FL. Mr. Zrallack was the project manager for quality assurance testing and inspection services for the S-65 lock structure rehabilitation project. Ardaman tested concrete and performed various testing and inspection services to verify the construction materials complied with project specifications.

Cypress Creek Restoration Project, Martin County, FL. Subsurface Soil Exploration and Geotechnical Engineering Evaluation for flood control levee retrofit project including slope stability and seepage analyses and recommended levee geometry improvements necessary for adequate factors of safety for design parameters.

SFWMD G-16 Canal CCCP Bank Slope Stability, Broward County, FL. Mr. Zrallack served as a senior project geotechnical engineer for this quantitative evaluation of the existing and proposed bank slope stability and channel shear stresses in order to make recommendations for canal bank repairs and/or stabilization and restoration. Subject portion of the G-16 Canal (Pompano Canal) included approximately 5.5 miles of canal bank. Recommendations for long-term stability and protection from erosion also required consideration for animal burrows from iguana and limited easement from congested urban development.

E-8 Canal Bank Stabilization Project, Port St. Lucie, FL. Mr. Zrallack served as senior geotechnical engineer for this canal bank stabilization project on approximately one mile of the E-8 Canal in western Port St. Lucie. The project included subsurface soil exploration, geotechnical engineering analyses and construction quality assurance testing and inspection. A canal bank stabilization system consisting of rubble rip rap and geosynthetic reinforcement was designed and constructed to provide for improved performance and global stability of the canal banks. Mr. Zrallack also managed the construction materials testing and inspection services during the construction phase of the project.

D-9 Canal, Port St. Lucie, FL. Mr. Zrallack served as senior geotechnical engineer for this drainage canal bank stabilization project on the D-9 Canal, east of Bayshore Boulevard in Port St. Lucie. Ardaman performed a subsurface soil exploration and geotechnical engineering evaluation to assist in the design of a canal bank stabilization system. Various stabilization alternatives were evaluated and ultimately a system of gabion baskets was designed and constructed. The gabion basket approach provided stable canal banks while also providing sufficient maintenance easements on both sides of the canal. Mr. Zrallack also managed the construction materials testing and inspection services during the construction phase of the project.

Former HD King Seawall Replacement, Fort Pierce, FL. Mr. Zrallack served as senior geotechnical engineer for this seawall replacement project at the former HD King power plant site in downtown Fort Pierce. Concrete panel walls secured by precast concrete driven piles were installed with a vibratory hammer to minimize nuisance vibrations and noise for nearby businesses and historic structures. Mr. Zrallack designed and managed the vibration monitoring plan for the pile driving operations, which included pre-construction and post-construction surveys of adjacent structures.

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REFERENCES

E-28-19

TETRA TECH

REFERENCES

Our team is proud to provide the following clients as viable references for similar projects in the tri-county area. These references are extremely familiar with the extra effort put forth by staff members to establish and maintain good working relationships, as we will do with the City of Pompano Beach. We encourage you to contact these references for additional proof of our team member's excellent record of superior services. Detailed descriptions of these projects are provided in Section 3 – Statement of Skills and Experience of Project Team.

Client Reference	Summary of Scope of Services	Construction Cost (CC) or Fee
Wisler Pierre-Louis Public Works Director City of North Miami Phone: 305.895.9830 Email: wpierre-louis@northmiamifl.gov	Owners Engineering Representative. Tetra Tech was retained as the Owner's Engineering Representative to provide an independent review of reports, contract documents, and other deliverables and functions for the rehabilitation and expansion of the Winson Water Treatment Plant including testing and rehabilitation of seven water supply wells. Acted as an extension of City of North Miami Engineering staff for this and other projects.	$600,000 (Fee) $25M (CC)
Jeff An, Ph.D, PE Senior Program Manager Miami-Dade Water and Sewer Department Phone: 786.268.5156 E-mail: Huren.An@miamidade.gov	Norwood-Oeffler Water Treatment Plant Expansion Program to 32.0 MGD. Tetra Tech was retained to perform preliminary design, increase wellfield capacity by designing, constructing, testing new Biscayne aquifer and Floridan aquifer water wells. Work also included water use permitting for an allocation from the new wells and increase the overall WUP allocation, final design, permitting, and construction services to expand plant capacity to treat a total of 32.0 MGD with nanofiltration and low pressure reverse osmosis technologies.	$9M (Fee) $65M (CC)
Doug Yoder Deputy Director Miami-Dade County Water and Sewer Department Phone: 786.552.8979 Email: yoderd@miamidade.gov	Water, Wastewater, and Reclaimed Water Master Planning. Tetra Tech responsible for updating and maintaining a comprehensive plan for the future of its water, wastewater, and reclaimed water utility infrastructure. Services provide hydraulic modeling, flow projections, master planning, operational studies, hydrogeological evaluations, geological evaluations, process optimization, cost estimating, scheduling, and additional engineering support services as requested by MDWASD.	$7M (Fee)
Celce Aurelus Assistant Director City of Hollywood Phone: 954.921.3930 Email: caurelus@hollywoodfl.org	Water Main Replacement. Tetra Tech is managing the surveying, geotechnical evaluations, design, permitting, and construction administration services on multiple projects being completed concurrently. The entire program is comprised of over 225,000 linear feet (42 miles) of water main replacement, reconnection of over 1,000 service connections, numerous underground and overhead utilities conflicts, permitting through multiple agencies, and construction within schedule and budget. Existing aged cast iron water mains were replaced with both DIP and PVC water mains, ranging from 4-inch to 24-inch diameters.	$2.8M (Fee) $28.3M (CC)

Client Reference	Summary of Scope of Services	Construction Cost (CC) or Fee
Ralph Terrero (retired) Miami-Dade County Water and Sewer Department Phone: 786.552.8112	Tetra Tech provided construction administration services for the South Miami Heights water treatment facility and high service pumping facility for Miami Dade Water and Sewer Department. Tetra Tech's services include structural, electrical, process and mechanical engineering support. Tetra Tech also provided engineering and design support for the rehabilitation of the Alexander Orr Water Treatment Facility rehabilitation. On-going projects include lime sludge disposal improvements and process optimization.	$1.1M (Fee) (S. Miami Heights) $1.1M (Fee) (Alexander Orr WTP)
Diana Rivera, PE, PMP, Project Manager Palm Beach County Water Utilities Phone: 561.493.6117	System-wide Wellfield Improvements Project WUD 16-017, Phases 1 & 2. JLA provided hydrogeologic consulting services to assist Palm Beach County Water Utilities Department in the system-wide rehabilitation and improvements of 21 wells located throughout Water Treatment Plants Nos. 2, 3, 8 & 9. The scope of services included preliminary investigational work, smart wellfield analyses, well design, bidding, and construction phase services. The preliminary work for the project included pilot hole drilling, geotechnical investigations, ground penetrating radar, topographical survey, well siting, historical data review and existing well sites review.	$1.35M (JLA Fee) $12M (JLA CC)
David Brown Director of Utilities Town of Jupiter Phone: 561.746.5134	JLA designed and constructed 16 new surficial aquifer production wells for the Town of Jupiter Water System. The wells were successfully completed without screens in order to minimize maintenance and loss of capacity experienced with screened wells. The well construction techniques and final wellfield design were based on the results of a preliminary pilot test drilling and sampling program. All of the wells have good productive capacities and three of the wells now have the highest capacities ever recorded for the Town of Jupiter. The majority of the wells produce over 750 gpm. Wells 68, 42, and 43 will produce 1000 gpm, 1350 gpm and 1300 gpm respectively. Sand content in the raw water from each well are below the target of 1 ppm at designed pumping rates.	$46,850 (JLA Fee)
Scott Burns, P.G. Senior Environmental Specialist Florida Power & Light Company Phone: 561.694.4633	Groundwater Monitoring Network Design, Permitting and Construction Management. JLA was contracted by FPL to provide hydrogeologic consulting services during construction of 14 monitor well clusters for the FPL, Turkey Point Plant Groundwater, Surface Water and Ecological Monitoring Plan (The Plan). The Plan was developed in cooperation with FPL, South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (FDEP) and Miami-Dade County Department of Environmental Resource Management (DERM) to identify the spatial distribution of Turkey Point Plant cooling canal system (CCS) water.	$24,598 (JLA Fee)
Poonam K Kalkat PhD. Director of Public Utilities City of West Palm Beach Phone: 561.822.2284 Cell: 561.644.9323	JLA assisted the City of West Palm Beach evaluate the water supply options and obtaining a permit renewal from the South Florida Water Management District (SFWMD). Potential alternative sources for the City's water supply were checked, including groundwater withdrawals from the Surficial and Floridan Aquifers, and also aquifer storage and recovery (ASR). JLA developed and applied a calibrated MODFLOW model of the Surficial Aquifer System (SAS) consistent with SFWMD requirements for consumptive use permitting. This model was constructed by extracting relevant input from the SFWMD Lower East Coast sub Regional (LECsR) MODFLOW model.	$101,054 (JLA fee - Study Only)

Additional Client References

In addition to the references we provided above, listed below are supplemental client references from JLA:

Town of Jupiter Utilities
David Brown,Director of Utilities
Amanda Barnes, Assist. Director of Utilities
(561) 746-5134
210 Military Trail
Jupiter, FL 33468
Davidb@jupiter.fl.us
amandab@jupiter.fl.us

NextEra Energy
Matthew Raffenberg, Senior Director,
Environmental Services
(561) 691-2808
700 Universe Boulevard
Juno Beach, FL 33408
Matthew.Raffenberg@nexteraenergy.com

Town of Jupiter Island
South Martin Regional Utility (SMRU)
Mario Loaiza, Utility Director
(772) 546-6259
9650 SE Water Street
Hobe Sound, FL 33475
mloaiza@tji.martin.fl.us

LIST OF PRIOR PROJECTS PERFORMED FOR THE CITY

Tetra Tech is working on several projects with the City which is listed below:

- Hurricane Hardening for the Water Treatment Plant Filter and High Service Pumps 1 – 4 Building
- Hurricane Hardening for the Water Treatment Plant Chemical Feed Building
- Hurricane Hardening for the Water Treatment Plant Sludge Dewatering Building
- Hurricane Hardening for the Water Treatment Plant Filter / Administration Building with Exterior Tanks and Membrane Building
- Reuse Water Master Plan Updates

This knowledge base, combined with our established office location in Hollywood will allow our team to deliver quality, cost-effective engineering services to the City of Pompano Beach.

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OFFICE LOCATIONS

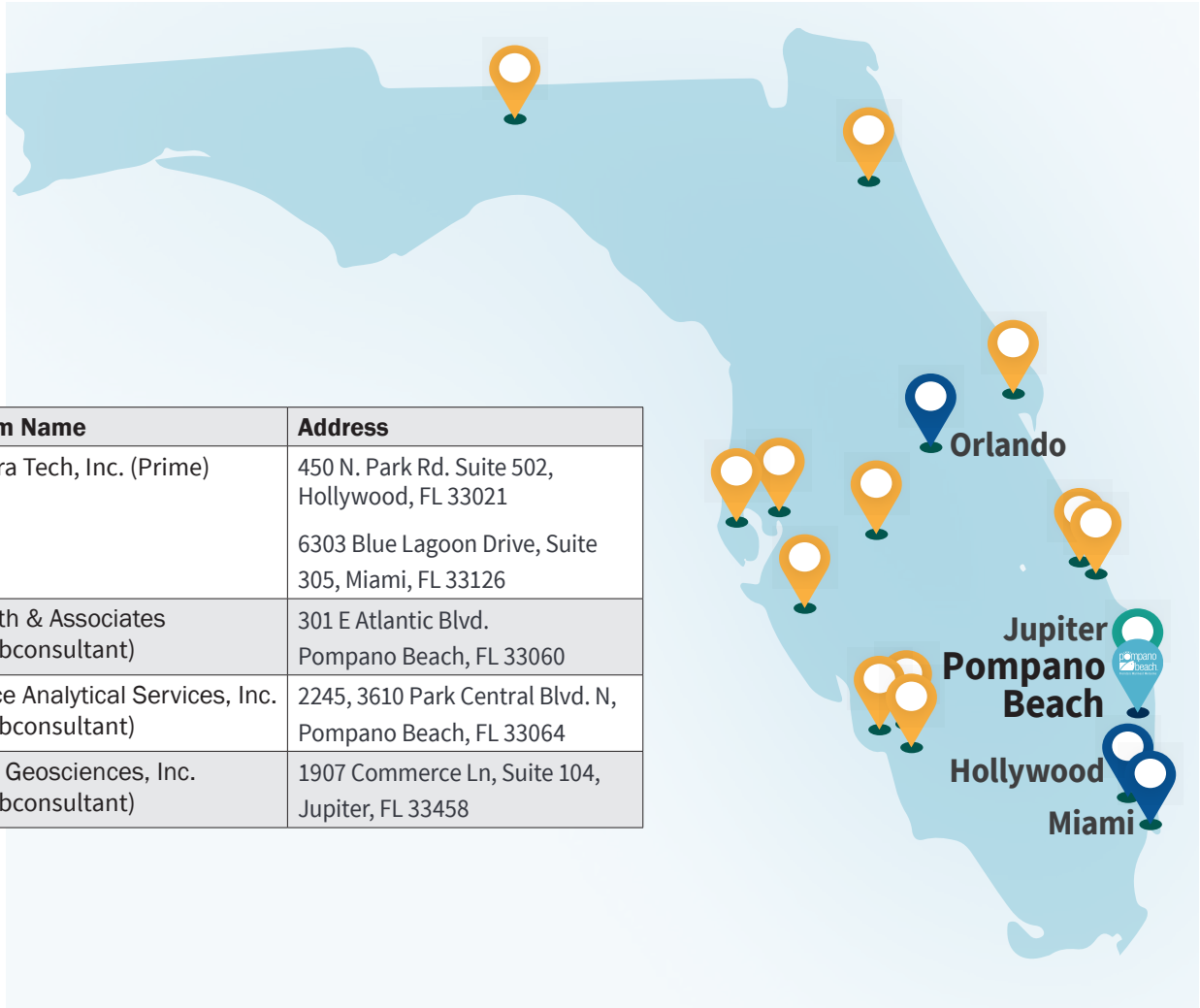
E-28-19

TETRA TECH

OFFICE LOCATIONS

Tetra Tech will manage and perform work under this contract from our Hollywood office (450 N. Park Rd. Suite 502, Hollywood, FL 33021) office which is located approximately 18 miles from the City of Pompano Beach Purchasing office. We will also utilize our nearby Miami office (6303 Blue Lagoon Drive, Suite 305, Miami, FL 33126) as well as our southeastern design center located in Orlando. We serve surrounding municipalities from this location and find that the close proximity allows our team to provide cost-effective services while maintaining strict schedule time frames. Project Manager, Chuck Drake, will work out of our Hollywood office. He will be supported by Ken Caban out of the Miami offices, and, because of his proximity to the City, he will facilitate coordination and good communication between the Tetra Tech team and City staff, which is essential to successfully completing any project.

Additionally, the key personnel assigned to this project have a strong local presence and established relationships with local regulatory agencies. We understand the importance of providing local services and we are available to interface with the City staff on a daily basis throughout the duration of this contract. The table and map below shows the addresses of Tetra Tech's offices and our subconsultants.



Firm Name	Address
Tetra Tech, Inc. (Prime)	450 N. Park Rd. Suite 502, Hollywood, FL 33021 6303 Blue Lagoon Drive, Suite 305, Miami, FL 33126
Keith & Associates (Subconsultant)	301 E Atlantic Blvd. Pompano Beach, FL 33060
Pace Analytical Services, Inc. (Subconsultant)	2245, 3610 Park Central Blvd. N, Pompano Beach, FL 33064
JLA Geosciences, Inc. (Subconsultant)	1907 Commerce Ln, Suite 104, Jupiter, FL 33458

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LOCAL BUSINESSES

E-28-19

TETRA TECH

LOCAL BUSINESS

Tetra Tech has committed several local businesses to our team including Keith & Associates, Inc. and Pace Analytical Services, Inc. The Local Business Program Forms (A-D), are provided on the following pages. We have also included our Tier 1 and Tier 2 Forms.

LOCAL BUSINESS EXHIBIT "A"
CITY OF POMPANO BEACH, FLORIDA
LOCAL BUSINESS PARTICIPATION FORM

Solicitation Number & Title: Raw Water Well Consulting Services

Prime Contractor's Name: Tetra Tech

Name of Firm, Address	Contact Person, Telephone Number	Type of Work to be Performed/Material to be Purchased	Contract Amount
Keith, 301 E. Atlantic Blvd. Pompano Beach, FL 33060	954.788.3400	Surveying and GIS services	TBD
JLA Geosciences, Inc	561.746.0228 x107	Assist with groundwater flow/ transport modeling; provide well design,	TBD
1907 Commerce Lane, Suite 104, Jupiter, FL 33457		construction management and testing services.	
Pace Analytical Services	954.582.4300	Provide raw water quality analytical services and test for primary /	TBD
3610 Park Central Blvd. N., Pompano Beach, FL33064		secondary standards and SDI	

LOCAL BUSINESS EXHIBIT "A"

EXHIBIT B
LOCAL BUSINESS
LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

RLI Number **RLI** E-28-19

TO: Tetra Tech
(Name of Prime or General Bidder)

The undersigned City of Pompano Beach business intends to perform subcontracting work in connection with the above contract as (check below)

_____ an individual __X__ a corporation

_____ a partnership _____ a joint venture

The undersigned is prepared to perform the following work in connection with the above Contract, as hereafter described in detail:

Hydrogeologic Consulting Services

6/18/19
(Date)

JLA Geosciences, Inc.
(Name of Local Business Contractor)

1907 Commerce Lane, Suite 104
(address)

Jupiter, Florida 33458
(address City, State Zip Code)

BY: _____
(Name)

James L. Andersen, President JLA Geosciences

LOCAL BUSINESS EXHIBIT "B"
LOCAL BUSINESS
LETTER OF INTENT TO PERFORM AS A LOCAL SUBCONTRACTOR

Bid Number E-28-19

TO: Tetra Tech
(Name of Prime or General Bidder)

The undersigned City of Pompano Beach business intends to sell commodities or perform subcontracting work in connection with the above contract as (check below)

_____ an individual
X a corporation
_____ a partnership
_____ a joint venture

The undersigned is prepared to sell product(s) or perform the following work in connection with the above Contract, as hereafter described in detail:

Survey / GIS

TBD

at the following price: _____

6/28/19
(Date)

KEITH
(Name of Local Business Contractor)
301 E. Atlantic Boulevard
(address)
Pompano Beach, FL 33060
(address City, State Zip Code)

BY: Alex Lazowick, PE, PMP
(Name)

Subcontractor Signature

LOCAL BUSINESS EXHIBIT "B"
LOCAL BUSINESS
LETTER OF INTENT TO PERFORM AS A LOCAL SUBCONTRACTOR

Bid Number E-28-19

TO: Tetra Tech, Inc.
(Name of Prime or General Bidder)

The undersigned City of Pompano Beach business intends to sell commodities or perform subcontracting work in connection with the above contract as (check below)

_____ an individual
__X__ a corporation
_____ a partnership
_____ a joint venture

The undersigned is prepared to sell product(s) or perform the following work in connection with the above Contract, as hereafter described in detail:

Lab work for raw water quality analytical services

at the following price: _____

6/28/2019
(Date)

Pace Analytical
(Name of Local Business Contractor)
3610 Park Central Blvd. N
(address)
Pompano Beach, FL 33064
(address City, State Zip Code)
BY: Neshma Castaneda
(Name)

Subcontractor Signature _____

RICK SCOTT, GOVERNOR

JONATHAN ZACHEM, SECRETARY

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

BOARD OF PROFESSIONAL GEOLOGISTS

THE GEOLOGY BUSINESS HEREIN IS CERTIFIED UNDER THE
PROVISIONS OF CHAPTER 492, FLORIDA STATUTES

JLA GEOSCIENCES INC

1907 COMMERCE LANE
SUITE 104
JUPITER FL 33458

LICENSE NUMBER: GB510

EXPIRATION DATE: JULY 31, 2020

Always verify licenses online at MyFloridaLicense.com

Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.

State of Florida
Department of State

I certify from the records of this office that JLA GEOSCIENCES, INC. is a corporation organized under the laws of the State of Florida, filed on January 6, 2003, effective January 6, 2003.

The document number of this corporation is P03000001272.

I further certify that said corporation has paid all fees due this office through December 31, 2019, that its most recent annual report/uniform business report was filed on January 30, 2019, and that its status is active.

I further certify that said corporation has not filed Articles of Dissolution.

Given under my hand and the Great Seal of the State of Florida at Tallahassee, the Capital, this the Thirtieth day of January, 2019

GREAT SEAL OF THE STATE OF FLORIDA
IN GOD WE TRUST

Jennifer Kennedy
Secretary of State

Tracking Number: 0633054786CC

To authenticate this certificate,visit the following site,enter this number, and then follow the instructions displayed.

https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication

Florida Department of Agriculture and Consumer Services
Division of Consumer Services
Board of Professional Surveyors and Mappers
2005 Apalachee Pkway Tallahassee, Florida 32399-6500
800HELPFLA(435-7352) or (850) 488-2221

February 1, 2019

KEITH AND ASSOCIATES INC
301 EAST ATLANTIC BLVD
POMPANO BEACH, FL 33060-6643

SUBJECT: Professional Surveyor and Mapper Business Certificate # LB6860

Your application / renewal as a professional surveyor and mapper business as required by Chapter 472, Florida Statutes, has been received and processed.

The license appears below and is valid through February 28, 2021.

You are required to keep your information with the Board current. Please visit our website at www.800helpfla.com/psm to create your online account. If you have already created your online account, you can use the website to maintain your license. You can also find other valuable information on the website.

If you have any questions, please do not hesitate to call the Division of Consumer Services, Board of Professional Surveyors and Mappers at 800-435-7352 or 850-488-2221.

Detach Here

Florida Department of Agriculture and Consumer Services
Division of Consumer Services
Board of Professional Surveyors and Mappers
2005 Apalachee Pkway Tallahassee, Florida 32399-6500

License No.: **LB6860**
Expiration Date February 28, 2021

Professional Surveyor and Mapper Business License

Under the provisions of Chapter 472, Florida Statutes

KEITH AND ASSOCIATES INC
301 EAST ATLANTIC BLVD
POMPANO BEACH, FL 33060-6643

nicole fried

NICOLE "NIKKI" FRIED
COMMISSIONER OF AGRICULTURE

This is to certify that the professional surveyor and mapper whose name and address are shown above is licensed as required by Chapter 472, Florida Statutes.

pompano beach
Florida's Warmest Welcome

CITY OF POMPANO BEACH
BUSINESS TAX RECEIPT
FISCAL YEAR: 2018 - 2019

THIS IS NOT A BILL

Business Tax Receipt Valid from: October 1, 2018 through September 30, 2019

9/5/2018

444959
PACE ANALYTICAL SERVICES INC
3610 PARK CENTRAL BLVD N
POMPANO BEACH FL 33064

THIS IS YOUR BUSINESS TAX RECEIPT. PLEASE POST IN A CONSPICUOUS PLACE AT THE BUSINESS LOCATION.

BUSINESS OWNER: PACE ANALYTICAL SERVICES INC
BUSINESS LOCATION: 3610 N PARK CENTRAL BL POMPANO BEACH FL

RECEIPT NO.	CLASSIFICATION
19-00075068	OFFICE-LAB

NOTICE: A NEW APPLICATION MUST BE FILED IF THE BUSINESS NAME, OWNERSHIP OR ADDRESS IS CHANGED. THE ISSUANCE OF A BUSINESS TAX RECEIPT SHALL NOT BE DEEMED A WAIVER OF ANY PROVISION OF THE CITY'S CODE NOR SHALL THE ISSUANCE OF A BUSINESS TAX RECEIPT BE CONSTRUED TO BE A JUDGEMENT OF THE CITY AS TO THE COMPETENCE OF THE APPLICANT TO TRANSACT BUSINESS. **THIS DOCUMENT CANNOT BE ALTERED.**

BUSINESS TAX RECEIPTS EXPIRE SEPTEMBER 30TH OF EACH YEAR

BROWARD COUNTY LOCAL BUSINESS TAX RECEIPT

115 S. Andrews Ave., Rm. A-100, Ft. Lauderdale, FL 33301-1895 – 954-831-4000

VALID OCTOBER 1, 2018 THROUGH SEPTEMBER 30, 2019

DBA:
Business Name: PACE ANALYTICAL SERVICES LLC

Receipt #: 329-255486
Business Type: ALL OTHERS (LAB SVC)

Owner Name: PAS PARENT INC
Business Location: 3610 PARK CENTRAL BLVD NORTH
POMPANO BEACH
Business Phone: 954 582 4300

Business Opened: 11/01/2011
State/County/Cert/Reg:
Exemption Code:

Rooms	Seats	Employees	Machines	Professionals
		23		

For Vending Business Only						
Number of Machines:			Vending Type:			
Tax Amount	Transfer Fee	NSF Fee	Penalty	Prior Years	Collection Cost	Total Paid
150.00	0.00	0.00	0.00	0.00	0.00	150.00

THIS RECEIPT MUST BE POSTED CONSPICUOUSLY IN YOUR PLACE OF BUSINESS

THIS BECOMES A TAX RECEIPT

WHEN VALIDATED

This tax is levied for the privilege of doing business within Broward County and is non-regulatory in nature. You must meet all County and/or Municipality planning and zoning requirements. This Business Tax Receipt must be transferred when the business is sold, business name has changed or you have moved the business location. This receipt does not indicate that the business is legal or that it is in compliance with State or local laws and regulations.

Mailing Address:

PAS PARENT INC
1800 ELM ST SE
MINNEAPOLIS, MN 55414

Receipt #05B-18-00000028
Paid 10/12/2018 150.00
09/30/2018 Effective Date

2018 - 2019

BROWARD COUNTY LOCAL BUSINESS TAX RECEIPT

115 S. Andrews Ave., Rm. A-100, Ft. Lauderdale, FL 33301-1895 – 954-831-4000

VALID OCTOBER 1, 2018 THROUGH SEPTEMBER 30, 2019

DBA:
Business Name: PACE ANALYTICAL SERVICES LLC

Receipt #: 329-255486
Business Type: ALL OTHERS (LAB SVC)

Owner Name: PAS PARENT INC
Business Location: 3610 PARK CENTRAL BLVD NORTH
POMPANO BEACH
Business Phone: 954 582 4300

Business Opened: 11/01/2011
State/County/Cert/Reg:
Exemption Code:

Rooms	Seats	Employees	Machines	Professionals
		23		

Signature	For Vending Business Only					
	Number of Machines:			Vending Type:		
Tax Amount	Transfer Fee	NSF Fee	Penalty	Prior Years	Collection Cost	Total Paid
150.00	0.00	0.00	0.00	0.00	0.00	150.00

Receipt #05B-18-00000028
Paid 10/12/2018 150.00
09/30/2018 Effective Date

LOCAL BUSINESS EXHIBIT "C

LOCAL BUSINESS
UNAVAILABILITY FORM

BID # E-28-19

I, Charles Drake, Vice President
(Name and Title)

of Tetra Tech, Inc., certify that on the 28th day of June, 2019, I invited the following LOCAL BUSINESSES to bid work items to be performed in the City of Pompano Beach:

Business Name, Address	Work Items Sought	Form of Bid Sought (i.e., Unit Price, Materials/Labor, Labor Only, etc.)
	Not Applicable	

Said Local Businesses:

___ Did not bid in response to the invitation

___ Submitted a bid which was not the low responsible bid

___ Other:_____

Name and Title: Charles Drake, Vice President

Date: 6/28/2019

Note: Attach additional documents as available.

LOCAL BUSINESS EXHIBIT "D"
GOOD FAITH EFFORT REPORT
LOCAL BUSINESS PARTICIPATION

BID # E-28-19

1. What portions of the contract have you identified as Local Business opportunities?

Surveying, GIS, ground water flow/transport modeling, well design, construction management, testing, lab work for raw water quality analytical services and test for primary / secondary standards and SDI

2. Did you provide adequate information to identified Local Businesses? Please comment on how you provided this information.

Tetra Tech has a long working history with Keith and Pace Analytics who are both located in Pompano Beach and have worked on previous City projects. Their local business certificates are included in this submittal

3. Did you send written notices to Local Businesses?

____ Yes ___X___ No

If yes, please include copy of the notice and the list of individuals who were forwarded copies of the notices.

4. Did you advertise in local publications?

____ Yes ___X___ No

If yes, please attach copies of the ads, including name and dates of publication.

5. What type of efforts did you make to assist Local Businesses in contracting with you ?

Tetra Tech contacted local businesses who have worked with the City on previous Pompano Beach projects.

7. List the Local Businesses you will utilize and subcontract amount.

Keith and Associates	$ TBD
Pace Analytical Services	$ TBD
	$

8. Other comments: We have also included JLA Geosciences, Inc. to supplement our team. They will provided Surveying and GIS services.

TIER 1/TIER 2 COMPLIANCE FORM

IN ORDER FOR YOUR FIRM TO COMPLY WITH THE CITY'S LOCAL BUSINESS PROGRAM AS A TIER 1 OR TIER 2 VENDOR, BIDDERS MUST COMPLETE THE INFORMATION BELOW AND UPLOAD THE FORM TO THE RESPONSE ATTACHMENTS TAB IN THE EBID SYSTEM.

TIER 1 LOCAL VENDOR

_____ My firm has maintained a permanent place of business within the city limits and maintains a staffing level, within this local office, of at least 10 % who are residents of the City of Pompano Beach.

And/Or

_____ My firm has maintained a permanent place of business within the city limits and my submittal includes subcontracting commitments to Local Vendors Subcontractors for at least 10 % of the contract value.

Or

__X__ My firm does not qualify as a Tier 1 Vendor.

TIER 2 LOCAL VENDOR

_____ My firm has maintained a permanent place of business within Broward County and maintains a staffing level, within this local office, of at least 15% who are residents of the City of Pompano Beach

And/Or

__X__ My firm has maintained a permanent place of business within Broward County and my submittal includes subcontracting commitments to Local Vendors Subcontractors for at least 20% of the contract value.

Or

_____ My firm does not qualify as a Tier 2 Vendor.

I certify that the above information is true to the best of my knowledge.

6/28/2019
(Date)

Tetra Tech, Inc.
(Name of Firm)

BY: Charles Drake, Vice President
(Name)

TIER 1/TIER 2 COMPLIANCE FORM

IN ORDER FOR YOUR FIRM TO COMPLY WITH THE CITY'S LOCAL BUSINESS PROGRAM AS A TIER 1 OR TIER 2 VENDOR, BIDDERS MUST COMPLETE THE INFORMATION BELOW AND UPLOAD THE FORM TO THE RESPONSE ATTACHMENTS TAB IN THE EBID SYSTEM.

TIER 1 LOCAL VENDOR

x My firm has maintained a permanent place of business within the city limits and maintains a staffing level, within this local office, of at least 10 % who are residents of the City of Pompano Beach.

And/Or

_____ My firm has maintained a permanent place of business within the city limits and my submittal includes subcontracting commitments to Local Vendors Subcontractors for at least 10 % of the contract value.

Or

_____ My firm does not qualify as a Tier 1 Vendor.

TIER 2 LOCAL VENDOR

_____ My firm has maintained a permanent place of business within Broward County and maintains a staffing level, within this local office, of at least 15% who are residents of the City of Pompano Beach

And/Or

_____ My firm has maintained a permanent place of business within Broward County and my submittal includes subcontracting commitments to Local Vendors Subcontractors for at least 20% of the contract value.

Or

_____ My firm does not qualify as a Tier 2 Vendor.

I certify that the above information is true to the best of my knowledge.

6/21/2019
(Date)

KEITH
(Name of Firm)

BY: Alex Lazowick, PE, PMP
(Name)

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MINORITY BUSINESS ENTERPRISES

E-28-19

TETRA TECH

MINORITY BUSINESS ENTERPRISES

Tetra Tech is not a State certified Minority Business Enterprise (MBE) as defined by the Florida Small and Minority Business Assistance Act of 1985. However, Tetra Tech has committed to using Keith & Associates, Inc. (KEITH), has begun the process of becoming certified with the Women's Business Enterprise National Council (WBENC) and the National Association of Women Business Owners. KEITH previously held M/WBE Certifications with the following:

- Broward Health
- State of Florida
- Broward College
- Broward County Public Schools
- Miami-Dade County Public Schools
- Palm Beach County Public Schools
- FDOT
- Palm Beach County
- Broward County
- Miami-Dade County

KEITH's Principal-in-Charge, Dodie Keith-Lazowick, sits on a variety of committees dedicated to upholding the importance of such efforts. Committees include the Broward County Economic and Small Business Development Advisory Board and the School Board of Broward County Minority and Diversity Participation Advisory Committee.

BIDDERS ARE TO COMPLETE FORM AND UPLOAD COMPLETED FORM TO THE EBID SYSTEM

EXHIBIT E

MINORITY BUSINESS ENTERPRISE PARTICIPATION

RLI #E-28-19

List all members of your team that are a certified Minority Business Enterprise (as defined by the State of Florida.) You must include copies of the MBE certificates for each firm listed with your electronic submittal. **Not Applicable**

Name of Firm	Certificate Included?

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LITIGATION

E-28-19

TETRA TECH

LITIGATION

In the normal course of business, Tetra Tech, Inc. is subject to certain claims and lawsuits typically filed against the engineering and consulting professions, including contractual disagreements, workers' compensation, personal injury and other similar lawsuits. Tetra Tech maintains insurance coverage for its business and operations, subject to certain deductibles and policy limits against such claims. As described in Tetra Tech's most recent quarterly and annual reports filed with the U.S. Securities and Exchange Commission, Tetra Tech believes that the resolution of any such claims will not have a material effect on its financial position or results of operations. Below are any litigation cases in the State of Florida against Tetra Tech within the past 5 years:

L00491 | Regions Bank v. Ardaman

Date Opened: 10/16/15
Plaintiff: Regions Bank D/B/A Regions Mortgage
Defendant: Ardaman & Associates, Inc.
Case Number: 2015CA011328
Date Filed: 10/7/15
Court: Circuit Court, 15th Circuit, Palm Beach County, FL
Cause of Action: Foreclosure litigation
Disposition of Case: Ongoing

L00508 | Callaway Marine Tech. v. Tetra Tech

Date Opened: 03/16/16
Plaintiff: Callaway Marine Technologies, Inc.
Defendant: Tetra Tech, Inc.
Case Number: 1:16-cv-20855-DPG
Date Filed: 3/9/16
Court: U. S. District Court for the Southern District of Florida, Miami Division
Cause of Action: Contract Indebtedness
Disposition of Case: Closed

L00516 | Aanya Hospitality v. Tetra Tech

Date Opened: 7/8/16
Plaintiff: Aanya Hospitality, Inc.
Defendant: Tetra Tech, Inc.
Case Number: 2016-CA-550
Date Filed: 5/24/16
Court: Circuit Court, Fourth Judicial Circuit, in and for Clay County, FL
Cause of Action: Breach of Contract
Disposition of Case: Settled

L00517 | Phoenix Building Corp v. Tetra Tech

Date Opened: 8/4/16
Plaintiff: Phoenix Building Corp SE
Defendant: Tetra Tech, Inc.
Case Number: 16-2016-CA-004896-XXXX-MA
Date Filed: 7/25/16
Court: Circuit Court of the 4th Judicial Circuit in and for Duval County, FL
Cause of Action: Breach of Contract
Disposition of Case: Settled

L00527 | Two City Plaza Condo. Assoc. v. Ardaman

Date Opened: 10/21/16
Plaintiff: Two City Plaza Condominium Association, Inc.
Defendant: Ardaman & Associates, Inc.
Case Number: 50-2016-CA-011149-XXX-MB
Date Filed: 10/18/16
Court: Circuit Court of the 15th Judicial Circuit, Palm Beach County, FL
Cause of Action: Negligence
Disposition of Case: Ongoing

L00528 | Phoenix Building Corp SE v. Tetra Tech

Date Opened: 10/31/16
Plaintiff: Phoenix Building Corp SE
Defendant: Tetra Tech, Inc.
Case Number: 2016-ca-009194-o
Date Filed: 10/19/16
Court: Circuit Court of the 9th Judicial Circuit, Orange County, FL
Cause of Action: Breach of Contract
Disposition of Case: Closed

L00532 | Chubb Custom Insurance Co. v. Ardaman

Date Opened: 12/16/16
Plaintiff: Chubb Custom Insurance Company as subrogee of First Church of Christ Scientist
Defendant: Ardaman & Associates, Inc.
Case Number: 2016-031146-CA-01
Date Filed: 12/08/16
Court: Circuit Court of the 11th Judicial Circuit in and for Miami Dade County, Florida
Cause of Action: Negligence
Disposition of Case: Closed

PL00004 | Barcelona I Condominium Assoc. v. Ardaman

Date Opened: 07/17/17
Plaintiff: Barcelona I Condominium Association, Inc.
Defendant: Ardaman & Associates, Inc.
Case Number: 17-12847 CA 09
Date Filed: 05/26/17
Court: 11th Judicial Circuit, Miami Dade County, Florida
Cause of Action: Negligence
Disposition of Case: Dismissed, Reopened, Closed 9/19/18

PL00008 | Cecilia Sed et al. v. Ardaman

Date Opened: 08/08/17
Plaintiff: Cecilia Sed and Jorge Sed
Defendant: Ardaman & Associates, Inc.
Case Number: 17-CA-7271
Date Filed: 08/02/17
Court: Hillsborough County, Florida
Cause of Action: Negligence
Disposition of Case: Ongoing

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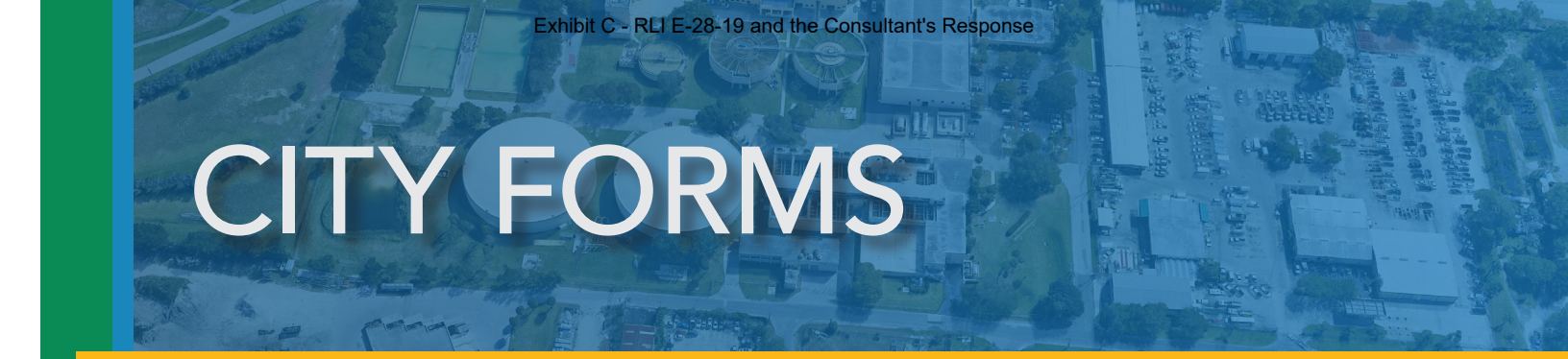
CITY FORMS

E-28-19

TETRA TECH



CITY FORMS

COMPLETE THE PROPOSER INFORMATION FORM ON THE ATTACHMENTS TAB IN THE EBID SYSTEM. PROPOSERS ARE TO COMPLETE FORM IN ITS ENTIRITY AND INCLUDE THE FORM IN YOUR PROPOSAL THAT MUST BE UPLOADED TO THE RESPONSE ATTACHMENTS TAB FOR THE RFQ IN THE EBID SYSTEM.

PROPOSER INFORMATION PAGE

RFQ E-28-19 (number), Raw Water Consulting Services (RFQ name)

To: The City of Pompano Beach, Florida

The below named company hereby agrees to furnish the proposed services under the terms stated subject to all instructions, terms, conditions, specifications, addenda, legal advertisement, and conditions contained in the RFQ. I have read the RFQ and all attachments, including the specifications, and fully understand what is required. By submitting this proposal, I will accept a contract if approved by the City and such acceptance covers all terms, conditions, and specifications of this proposal.

Proposal submitted by:

Name (printed) Charles Drake Title Vice President

Company (Legal Registered) Tetra Tech, Inc.

Federal Tax Identification Number 95-4148514

Address 1401 E. Broward Boulevard, Suite 302

City/State/Zip Ft. Lauderdale, Florida, 33301

Telephone No. 954.364.1752 Fax No. NA

Email Address Charles.drake@tetratech.com

Acknowledgement of Addenda

Tetra Tech reviewed all addenda issued on July 1, 2019, for this solicitation.
The closing date for the following bid has been extended to July 10, 2019 at 2PM (ET).

RAW WATER WELL CONSULTING SERVICES

E-28-19

TETRA TECH

450 N. Park Road, Suite 502 | Hollywood, Florida 33021
Business +1 (407) 256-7715 | tetratech.com