City of Peoria, Arizona
Notice of Request for Proposal
for Professional Services

Solicitation No.:	**P23-0013**	Proposal Due Date:	**November 29, 2022**
Capital Project No.:	UT00521	Proposal Due Time:	**5:00 P.M. AZ Time**
Materials and/or Services:	**Consulting Services for Advanced Metering Infrastructure (AMI)**	Purchasing Agent:	**Terry Andersen**
Contact Phone:	(623) 773-7981		
Contact Email:	Teresa.Andersen@peoriaaz.gov		

In accordance with City of Peoria Procurement Code competitive sealed proposals for the material or services specified will be received by the City of Peoria Materials Management at the specified location until the date and time cited above. Proposals shall be in the submitted on or prior to the exact date and time indicated above. Late proposals will not be considered, except as provided in the City of Peoria Procurement Code. ***Proposals shall be submitted electronically via the City's Procurement Portal (Bonfire) or in a sealed envelope with the Request for Proposal number and the offeror's name and address clearly indicated on the front of the envelope.*** Offerors are strongly encouraged to carefully read the ***entire*** Request for Proposal Package.

OFFER

To the City of Peoria: The undersigned, on behalf of the entity, firm, company, partnership, or other legal entity listed below, offers on its behalf to the City a proposal that contains all terms, conditions, specifications and amendments in the Notice of Request for Proposal issued by the City. Any exception to the terms contained in the Notice of Request for Proposal must be specifically indicated in writing and are subject to the approval of the City prior to acceptance. The signature below certifies your understanding and compliance with Paragraph 1 of the City of Peoria Standard Terms and Conditions (form COP 202) contained in the Request for Proposal package issued by the City.

For clarification of this offer contact:

Telephone: (602) 216-7200 Fax: N/A

Name: Michael Wolcott

Email: Michael.Worlton@ghd.com

GHD Inc.
Company Name

[redacted]
Authorized Signature for Offer

4747 N. 22nd Street, Suite 200
Address

Michael Wolcott
Printed Name

Phoenix AZ 85016
City State Zip Code

Business Group Leader - Constructions & Operations, U.S. West
Title

ACCEPTANCE OF OFFER AND CONTRACT AWARD (For City of Peoria Use Only)

Your offer is accepted by the City, subject to approval of each written exception that your proposal contained. The contract consists of the following documents: 1.) Request for Proposal issued by the City; 2.) Your offer in Response to the City's Request for Proposal; and 3.) This written acceptance and contract award. As the awarded professional service provider, you are now legally bound to provide the services listed by the attached award notice, based on the solicitation of proposals, including all terms, conditions, specifications, amendments and your offer as now accepted by the City. The professional service provider shall not commence any billable work or provide any services under this contract until the professional service provider receives an executed Purchase Order or a Notice to Proceed.

Attested by:

[redacted]
Lori Dyckman, City Clerk

CC: _____

Contract Number:
ACON04023

Official File: _____

City Seal

City of Peoria, Arizona. Effective Date: 02/13/2023

Approved as to form:

[redacted]
Acting City Attorney

Contract Awarded Date February 13, 2023.

[redacted]
Christine Finney, Materials Manager

REQUEST FOR PROPOSAL

INSTRUCTIONS TO OFFEROR

Materials Management
Procurement
9875 N. 85th Avenue
Peoria, Arizona 85345-6560
Phone: (623) 773-7115
Fax: (623) 773-7118

1. **PREPARATION OF PROPOSAL:**
   a. All proposals shall be on the forms (if any) provided in this *Request For Proposal* package . It is permissible to copy these forms if required. Telegraphic (facsimile) or mailgram proposals will not be considered.
   b. The Offer and Contract Award document (COP Form 203) shall be submitted with an original ink or digital signature by a person authorized to sign the offer.
   c. Erasures, interlineations, or other modifications in the proposal shall be initialed in original ink by the authorized person signing the Offer sheet.
   d. If price is a consideration and in case of error in the extension of prices in the proposal, the unit price shall govern. No proposal shall be altered, amended, or withdrawn after the specified proposal due date and time.
   e. Periods of time, stated as a number of days, shall be calendar days.
   f. It is the responsibility of all Offerors to examine the entire *Request For Proposal* package and seek clarification of any item or requirement that may not be clear and to check all responses for accuracy before submitting a bid. Negligence in preparing a Proposal confers no right of withdrawal after proposal due date and time.

2. **INQUIRIES:** Any question related to the *Request For Proposal* shall be directed to the purchasing agent whose name appears on the front. The Offeror shall not contact or ask questions of the department for which the requirement is being procured. Questions should be submitted in writing when time permits. The purchasing agent may require any and all questions be submitted in writing at the Buyer's sole discretion. Any correspondence related to a *Request For Proposal* should refer to the appropriate *Request For Proposal* number, page, and paragraph number. However, the Offeror shall not place the *Request For Proposal* number on the outside of any envelope containing questions since such an envelope may be identified as a sealed proposal and, if so, will not be opened until after the official *Request For Proposal* due date and time.

3. **PROSPECTIVE OFFERORS CONFERENCE:** A prospective offerors conference may be held. If scheduled, the date and time of this conference will be indicated within this document. The purpose of this conference will be to clarify the contents of this *Request For Proposal* in order to prevent any misunderstanding of the City's position. Any doubt as to the requirements of this *Request For Proposal* or any apparent omission or discrepancy should be presented to the City at this conference. The City will then determine if any action is necessary and may issue a written amendment to the *Request for Proposal*. Oral statements or instructions will not constitute an amendment to this *Request for Proposal*.

4. **LATE PROPOSALS:** Late Proposals will not be considered, except as provided by the **City of Peoria Procurement Code**. A professional service provider submitting a late proposal shall be so notified.

5. **WITHDRAWAL OF PROPOSAL:** At any time prior to the specified proposal due date and time, a professional service provider (or designated representative) may withdraw the proposal. Telegraphic (facsimile) or mailgram proposal withdrawals will not be considered.

6. **AMENDMENT OF PROPOSAL:** Receipt of a Solicitation Amendment (COP Form 207) shall be acknowledged by signing and returning the document prior to the specified proposal due date and time.

7. **PAYMENT:** The City will make every effort to process payment for the purchase of services within thirty (30) calendar days after receipt of services and a correct notice of amount due, unless a good faith dispute exists as to any obligation to pay all or a portion of the account. Any proposal that requires payment in less than thirty (30) calendar days shall not be considered.

8. **DISCOUNTS:** Payment discount periods will be computed from the date of receipt of service or correct invoice, whichever is later, to the date Buyer's payment is mailed. Unless freight and other charges are itemized, any discount provided will be taken on full amount of invoice. Payment discounts of thirty (30) calendar days or more will be deducted from the proposal price in determining the low bid. However, the Buyer shall be entitled to take advantage of any payment discount offered by the Offeror provided payment is made within the discount period.

9. **TAXES:** The City of Peoria is exempt from Federal Excise Tax, including the Federal Transportation Tax. Sales tax, if any, shall be indicated as a separate item.

10. **VENDOR REGISTRATION:** After the award of a contract, the successful Offeror shall have a completed Vendor Registration Form (COP Form 200) on file with the City of Peoria Materials Management Division.

11. **AWARD OF CONTRACT:**

    a. Notwithstanding any other provision of this *Request For Proposal*, The City expressly reserves the right to:

       (1) Waive any immaterial defect or informality: or
       (2) Reject any or all proposals, or portions thereof, or
       (3) Reissue a *Request For Proposal*.

    b. A response to a *Request For Proposal* is an offer to contract with the City based upon the terms, conditions and specifications contained in the City's *Request For Proposal* and the written amendments thereto, if any. Proposals do not become contracts unless and until they are accepted by the **City Council**. A contract is formed when written notice of award(s) is provided to the successful Offeror(s). The contract has its inception in the award document, eliminating a formal signing of a separate contract. For that reason, all of the terms and conditions of the procurement contract are contained in the *Request For Proposal*; unless modified by a Solicitation Amendment (COP Form 207) or a Contract Amendment (COP Form 217).

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THE FOLLOWING TERMS AND CONDITIONS ARE AN EXPLICIT PART OF THE SOLICITATION AND ANY RESULTANT CONTRACT.

1. **CERTIFICATION:** By signature in the Offer section of the Offer and Contract Award page (COP Form 203), the Professional Services Provider, (Consultant), certifies:

   a. The submission of the offer did not involve collusion or other anti-competitive practices.

   b. The Consultant shall not discriminate against any employee or applicant for employment in violation of Federal Executive Order 11246.

   c. The Consultant has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip favor, or service to a public servant in connection with the submitted offer. Failure to sign the offer, or signing it with a false statement, shall void the submitted offer or any resulting contracts, and the Consultant may be debarred.

2. **GRATUITIES:** The City may, by written notice to the Consultant, cancel this contract if it is found by the City that gratuities, in the form of entertainment, gifts or otherwise, were offered or given by the Consultant or any agent or representative of the Consultant, to any officer or employee of the City with a view toward securing an order, securing favorable treatment with respect to the awarding, amending, or the making of any determinations with respect to the performing of such order. In the event this contract is cancelled by the City pursuant to this provision, the City shall be entitled, in addition to any other rights and remedies, to recover or withhold from the Consultant the amount of the gratuity. Paying the expense of normal business meals which are generally made available to all eligible city government customers shall not be prohibited by this paragraph.

3. **APPLICABLE LAW:** In the performance of this agreement, contractors shall abide by and conform to any and all laws of the United States, State of Arizona and City of Peoria including but not limited to federal and state executive orders providing for equal employment and procurement opportunities, the Federal Occupational Safety and Health Act and any other federal or state laws applicable to this agreement.

   Contractor specifically understands and acknowledges the applicability to it of the Americans with Disabilities Act, including Section 508, the Immigration Reform and Control Act of 1986, and the Drug Free Workplace Act of 1989. In addition, if this agreement pertains to construction, Contractor must also comply with A.R.S. § 34-301, as amended (Employment of Aliens on Public Works Prohibited) and A.R.S. § 34-302, as amended (Residence Requirements for Employees).

   Under the provisions of A.R.S. § 41-4401, Contractor hereby warrants to the City that Contractor and each of its subcontractors ("Subcontractors") will comply with, and are contractually obligated to comply with, all Federal immigration laws and regulations that relate to their employees and A.R.S. § 23-214(A) (hereinafter, "Contractor Immigration Warranty").

   A breach of the Contractor Immigration Warranty shall constitute a material breach of this agreement and shall subject Contractor to penalties up to and including termination of this agreement at the sole discretion of the City. The City may, at its sole discretion, conduct random verification of the employment records of Contractor and any Subcontractors to ensure compliance with the Contractor Immigration Warranty. Contractor agrees to assist the City in regard to any random verifications performed.

   Neither Contractor nor any Subcontractor shall be deemed to have materially breached the Contractor Immigration Warranty if Contractor or the Subcontractor establishes that it has complied with the employment verification provisions prescribed by §§ 274A and 274B of the Federal Immigration and Nationality Act and the E-Verify requirements prescribed by A.R.S. §23-214(A).

   The provisions of this Paragraph must be included in any contract Contractor enters into with any Subcontractors who provide services under this agreement or any subcontract. "Services" is defined as furnishing labor, time or effort in the State of Arizona by a contractor or subcontractor. Services include construction or maintenance of any structure, building or transportation facility or improvement to real property.

   Contractor warrants, for the term of this agreement and for six months thereafter, that is has fully complied with the requirements of the Immigration Reform and Control Act of 1986 and all related or similar legal authorities.

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This contract shall be governed by the City and Contractor shall have all remedies afforded each by the Uniform Commercial Code, as adopted in the State of Arizona, except as otherwise provided in this contract or in statutes pertaining specifically to the City. This contract shall be governed by the laws of the State of Arizona and suit pertaining to this contract may be brought only in courts in the State of Arizona.

This contract is subject to the provisions of ARS §38-511; the City may cancel this contract without penalty or further obligations by the City or any of its departments or agencies if any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the City or any of its departments or agencies, is at any time while the contract or any extension of the contract is in effect, an employee of any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract.

To the extent applicable, Contractor certifies to City that it is not currently engaged in and agrees for the duration of the contract not to engage in a boycott of Israel as defined in the provisions of ARS § 35-393.

Pursuant to the provisions of ARS §35-394, Contractor certifies that it will not use, during the term of the Agreement, i) the forced labor of ethnic Uyghurs in the People's Republic of China, ii) any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China, or iii) any contractors, subcontractors, or suppliers that use forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China. To the extent that Contractor discovers an issue for its goods or services provided to the City which is in contravention of the certification above, it will notify the City as soon as practicable and take corrective actions in order to remain consistent with its certification.

4. **LEGAL REMEDIES:** All claims and controversies shall be subject to resolution according to the terms of the City of Peoria Procurement Code.

5. **CONTRACT:** The contract between the City and the Consultant shall consist of (1) the Solicitation, including instructions, all terms and conditions, specifications, scopes of work, attachments, and any amendments thereto, and (2) the offer submitted by the Consultant in response to the solicitation. In the event of a conflict in language between the Solicitation and the Offer, the provisions and requirements in the Solicitation shall govern. However, the City reserves the right to clarify, in writing, any contractual terms with the concurrence of the Consultant, and such written contract shall govern in case of conflict with the applicable requirements stated in the Solicitation or the Consultant's offer. The Solicitation shall govern in all other matters not affected by the written contract.

6. **CONTRACT AMENDMENTS:** This contract may be modified only by a written Contract Amendment (COP Form 217) signed by persons duly authorized to enter into contracts on behalf of the City and the Consultant.

7. **CONTRACT APPLICABILITY:** The Offeror shall substantially conform to the terms, conditions, specifications and other requirements found within the text of this specific Solicitation. All previous agreements, contracts, or other documents, which have been executed between the Offeror and the City are not applicable to this Solicitation or any resultant contract.

8. **PROVISIONS REQUIRED BY LAW:** Each and every provision of law and any clause required by law to be in the contract will be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the contract will forthwith be physically amended to make such insertion or correction.

9. **SEVERABILITY:** The provisions of this contract are severable to the extent that any provision or application held to be invalid shall not affect any other provision or application of the contract which may remain in effect without the invalid provision or application.

10. **RELATIONSHIP TO PARTIES:** It is clearly understood that each party will act in its individual capacity and not as an agent, employee, partner, joint venturer, or associate of the other. An employee or agent of one party shall not be deemed or construed to be the employee or agent of the other for any purpose whatsoever. The Consultant is advised that taxes or Social Security payments will not be withheld from any City payments issued hereunder and that the Consultant should make arrangements to directly pay such expenses, if any.

11. **INTERPRETATION-PAROL EVIDENCE:** This contract represents the entire agreement of the Parties with respect to its subject matter, and all previous agreements, whether oral or written, entered into prior to this contract are hereby revoked and superseded by this contract. No representations, warranties, inducements or oral agreements have been made by any of

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the Parties except as expressly set forth herein, or in any other contemporaneous written agreement executed for the purposes of carrying out the provisions of this contact. This contract may not be changed, modified or rescinded except as provided for herein, absent a written agreement signed by both Parties. Any attempt at oral modification of this contract shall be void and of no effect.

12. **NO DELEGATION OR ASSIGNMENT:** Contractor shall not delegate any duty under this Contract, and no right or interest in this Contract shall be assigned by Contractor to any successor entity or third party, including but not limited to an affiliated successor or purchaser of Contractor or its assets, without prior written permission of the City. The City, at its option, may cancel this Contract in the event Contractor undertakes a delegation or assignment without first obtaining the City's written approval. Contractor agrees and acknowledges that it would not be unreasonable for the City to decline to approve a delegation or assignment that results in a material change to the services provided under this Contract or an increased cost to the City.

13. **SUBCONTRACTS:** No subcontract shall be entered into by the Consultant with any other party to furnish any of the material, service or construction specified herein without the advance written approval of the City. The prime Consultant shall itemize all sub-contractors which shall be utilized on the project. Any substitution of sub-contractors by the prime Consultant shall be approved by the City and any cost savings will be reduced from the prime Consultant's bid amount. All subcontracts shall comply with Federal and State laws and regulations which are applicable to the services covered by the subcontract and shall include all the terms and conditions set forth herein which shall apply with equal force to the subcontract and if the Subcontractor were the Consultant referred to herein. The Consultant is responsible for contract performance whether or not Subcontractors are used.

14. **RIGHTS AND REMEDIES:** No provision in this document or in the Consultant's offer shall be construed, expressly or by implication, as waiver by the City of any existing or future right and/or remedy available by law in the event of any claim of default or breach of contract. The failure of the City to insist upon the strict performance of any term or condition of the contract or to exercise or delay the exercise of any right or remedy provided in the contract, or by law, or the City's acceptance of and payment for materials or services, shall not release the Consultant from any responsibilities or obligations imposed by this contract or by law, and shall not be deemed a waiver of any right of the City to insist upon the strict performance of the Contract.

15. **INDEMNIFICATION:** To the fullest extent permitted by law, the Consultant shall indemnify and hold harmless the City, and its officers and employees, from liabilities, damages, losses and costs, including reasonable attorney fees and court costs, but only to the extent caused by the negligence, recklessness or intentional wrongful conduct of the Consultant in the performance of the contract. The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

16. **OVERCHARGES BY ANTITRUST VIOLATIONS:** The City maintains that, in practice, overcharges resulting from antitrust violations are borne by the purchaser. Therefore, to the extent permitted by law, the Consultant hereby assigns to the City any and all claims for such overcharges as to the goods and services used to fulfill the Contract.

17. **FORCE MAJEURE:** Except for payment for sums due, neither party shall be liable to the other nor deemed in default under this Contract if and to the extent that such party's performance of this Contract is prevented by reason of force Majeure. The term *"force majeure"* means an occurrence that is beyond the control of the party affected and occurs without its fault or negligence. Without limiting the foregoing, force majeure includes acts of God: acts of the public enemy; war; acts of terror, hate crimes affecting public order; riots; strikes; mobilization; labor disputes; civil disorders; fire; floods; lockouts, injunctions-intervention-acts, or failures or refusals to act by government authority; events or obstacles resulting from a governmental authority's response to the foregoing; and other similar occurrences beyond the control of the party declaring force majeure which such party is unable to prevent by exercising reasonable diligence. The force majeure shall be deemed to commence when the party declaring force majeure notifies the other party of the existence of the force majeure and shall be deemed to continue as long as the results or effects of the force majeure prevent the party from resuming performance in accordance with this Contract.

    Force majeure shall not include the following occurrences:

    a. Last minute failure of office equipment is not force majeure.

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b. Late performance by a subcontractor unless the delay arises out of a force majeure occurrence in accordance with this Force Majeure term and Condition.

Any delay or failure in performance by either party hereto shall not constitute default hereunder or give rise to any claim for damages or loss of anticipated profits if, and to the extent that such delay or failure is caused by force majeure. If either party is delayed at any time in the progress of the work by force majeure, then the delayed party shall notify the other party in writing of such delay within forty-eight (48) hours commencement thereof and shall specify the causes of such delay in such notice. Such notice shall be hand delivered or mailed *Certified-Return Receipt* and shall make a specific reference to this article, thereby invoking its provisions. The delayed party shall cause such delay to cease as soon as practicable and shall notify the other party in writing. The time of completion shall be extended by contract modification for a period of time equal to the time that the results or effects of such delay prevent the delayed party from performing in accordance with this contract.

18. **RIGHT TO ASSURANCE:** Whenever one party to this contract in good faith has reason to question the other party's intent to perform he may demand that the other party give a written assurance of this intent to perform. In the event that a demand is made and no written assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the Contract.

19. **RIGHT TO AUDIT RECORDS:** The City may, at reasonable times and places, audit the books and records of any Contractor as related to any contract held with the City. This right to audit also empowers the City to inspect the papers of any Contractor or Subcontractor employee who works on this contract to ensure that the Contractor or Subcontractor is complying with the Contractor Immigration Warranty made pursuant to Paragraph 3 above.

20. **RIGHT TO INSPECT:** The City may, at reasonable times, inspect the part of the place of business of a Consultant or Subcontractor which is related to the performance of any contract as awarded or to be awarded.

21. **WARRANTIES:** Consultant warrants that all services delivered under this contract shall conform to the specifications of this contract. Consultant warrants that all services shall be performed in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances. Additional warranty requirements may be set forth in the solicitation.

22. **INSPECTION:** All services are subject to final inspection and acceptance by the City. Services failing to conform to the specifications of this Contract will be held at Consultant's risk and may be returned to the Consultant. If so returned, all costs are the responsibility of the Consultant. The City may elect to do any or all:

    a. Waive the non-conformance.

    b. Stop the work immediately.

    c. Bring material into compliance.

    This shall be accomplished by a written determination for the City.

23. **TITLE AND RISK OF LOSS:** The title and risk of loss of service shall not pass to the City until the City actually receives the service at the point of delivery, unless otherwise provided within this Contract.

24. **NO REPLACEMENT OF DEFECTIVE TENDER:** Every tender of materials shall fully comply with all provisions of the Contract. If a tender is made which does not fully conform, this shall constitute a breach of the Contract as a whole.

25. **DEFAULT IN ONE INSTALLMENT TO CONSTITUTE TOTAL BREACH:** Consultant shall deliver conforming materials in each installment of lot of this Contract and may not substitute nonconforming materials. Delivery of nonconforming materials or a default of any nature, at the option of the City, shall constitute a breach of the Contract as a whole.

26. **LICENSES:** Consultant shall maintain in current status all Federal, State and Local licenses and permits required for the operation of the business conducted by the Consultant as applicable to this Contract.

27. **PATENTS AND COPYRIGHTS:** All services, information, computer program elements, reports and other deliverables, which may be patented or copyrighted and created under this contract are the property of the City and shall not be used or released by the Consultant or any other person except with the prior written permission of the City.

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28. **PREPARATION OF SPECIFICATIONS BY PERSONS OTHER THAN CITY PERSONNEL:** All specifications shall seek to promote overall economy for the purposes intended and encourage competition and not be unduly restrictive in satisfying the City's needs. No person preparing specifications shall receive any direct or indirect benefit from the utilization of specifications, other than fees paid for the preparation of specifications.

29. **COST OF PROPOSAL PREPARATION:** The City shall not reimburse the cost of developing presenting or providing any response to this solicitation. Offers submitted for consideration should be prepared simply and economically, providing adequate information in a straightforward and concise manner.

30. **PUBLIC RECORD:** All offers submitted in response to this solicitation shall become the property of the City and shall become a matter of public record available for review, subsequent to the award notification, in accordance with the City's Procurement Code. However, subsequent to the award of the contract, any information and documents obtained by the City during the course of an audit conducted in accordance with Paragraph 19 above for the purpose of determining compliance by Contractor or a Subcontractor with the Contractor Immigration Warranty mandated by Paragraph 3 above shall remain confidential and shall not be made available for public review or produced in response to a public records request, unless the City is ordered or otherwise directed to do so by a court of competent jurisdiction.

31. **ADVERTISING:** Consultant shall not advertise or publish information concerning this Contract, without prior written consent of the City.

32. **DELIVERY ORDERS:** The City shall issue a Purchase Order for the services covered by this contract. All such documents shall reference the contract number as indicated on the Offer and Contract Award (COP Form 203).

33. **FUNDING:** Any contract entered into by the City of Peoria is subject to funding availability. Fiscal years for the City of Peoria are July 1 to June 30. The City Council approves all budget requests. If a specific funding request is not approved, the contract shall be terminated.

34. **DISCLAIMER:** The City of Peoria, Arizona provides current and complete solicitation information for registered Plan Holders only. Updates, amendments and related information regarding the solicitation contained herein will be delivered only to registered Plan Holders. The City assumes no liability or duty to so update or send any update to persons who are not Plan Holders. Any person who acquires these documents from any source other than the City website or directly from the Materials Management Division, has no assurance that the solicitation is valid. No person may amend this document, nor may any person publish it without this disclaimer.

35. **PAYMENT:** A separate invoice shall be issued for each service performed, and no payment will be issued prior to receipt of services and correct invoice.

36. **PROHIBITED LOBBYING ACTIVITIES:** The Offeror, his/her agent or representative shall not contact, orally or in any written form any City elected official or any City employee other than the Materials Management Division, the procuring department, City Manager, Deputy City Manager or City Attorney's office (for legal issues only) regarding the contents of this solicitation or the solicitation process commencing from receipt of a copy of this request for proposals and ending upon submission of a staff report for placement on a City Council agenda. The Materials Manager shall disqualify an Offeror's proposal for violation of this provision. This provision shall not prohibit an Offeror from petitioning an elected official after submission of a staff report for placement on a City Council agenda or engaging in any other protected first amendment activity after submission of a staff report for placement on a City Council agenda.

37. **PROHIBITED POLITICAL CONTRIBUTION:** Consultant during the term of this Agreement shall not make a contribution reportable under Title 16, Chapter 6, Article 1, Arizona Revised Statutes to a candidate or candidate committee for any city elective office during the term of this Agreement. The City reserves the right to terminate the Agreement without penalty for any violation of this provision.

SPECIAL TERMS AND CONDITIONS

Solicitation Number: **P23-0013**

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1. **Purpose:** Pursuant to provisions of the City Procurement Code, the City of Peoria, Materials Management Division intends to establish a contract for Consulting Services for **Advanced Metering Infrastructure (AMI).**
2. **Authority:** This Solicitation as well as any resultant contract is issued under the authority of the City. No alteration of any resultant contract may be made without the express written approval of the City Materials Manager in the form of an official contract amendment. Any attempt to alter any contract without such approval is a violation of the contract and the City Procurement Code. Any such action is subject to the legal and contractual remedies available to the City inclusive of, but not limited to, contract cancellation, suspension and/or debarment of the Consultant.
3. **Offer Acceptance Period:** In order to allow for an adequate evaluation, the City requires an offer in response to this Solicitation to be valid and irrevocable for ninety (90) days after the opening time and date.
4. **Eligible Agencies:** Any contract resulting from this Solicitation shall be for the exclusive use of the City of Peoria.
5. **Contract Type:** Not to Exceed.
6. **Term of Contract:** The term of any resultant contract shall commence upon the effective date indicated on page 1 and shall remain in effect until all work required by the contractor is completed and accepted by the City. Work shall not commence until authorization to proceed is received from the City.
7. **Affirmative Action:** It is the policy of the City of Peoria that suppliers of goods or services to the City adhere to a policy of equal employment opportunity and demonstrate an affirmative effort to recruit, hire, and promote regardless of race, color, religion, gender, national origin, age or disability. The City of Peoria encourages diverse suppliers to respond to solicitations for products and services.
8. **Discussions:** In accordance with the City of Peoria Procurement Code, after the initial receipt of proposals, discussions may be conducted with Offerors who submit proposals determined to be reasonably susceptible of being selected for award.
9. **Interview Guidelines:** During any requested interview, which would be scheduled in the future, be prepared to discuss your firm's proposal, staff assignments, project approach and other pertinent information. The presentation shall be approximately 30 minutes, allowing 30 minutes for a question and answer session. The Consultant's Project/Team Manager shall lead the presentation team and answer questions on behalf of the Consultant. If work involves a major sub-consultant, the firms Project/Team Manager's presence may also be requested (by the City) at the interview.
10. **Proposal Opening:** Proposals shall be submitted no later than the due date and time indicated in the request for proposals. All information contained in the proposals shall be deemed as exempt from public disclosure based on the City's need to avoid disclosure of contents prejudicial to competing offerors during the process of negotiation. The proposals shall not be open for public inspection until after contract award. After contract award, the successful proposal and the evaluation documentation shall be open for public inspection.
11. **Performance Warranty**: This section does not relieve Consultant from its obligation to provide Work and Materials/Design Materials appropriate to the purposes of this Project. Nothing in this Agreement creates any contractual liability between the City of Peoria and any Subcontractor; however, the City of Peoria is an intended third-party beneficiary of all contracts for services, all Subcontracts, purchase orders and other agreements between the Consultant and third parties. The Consultant must incorporate the obligations of this Agreement into its respective Subcontracts, supply agreements and purchase orders.
12. **Permits and Approvals:** Consultant agrees and undertakes to obtain necessary permits and approvals, as per the scope of work, from all local, state and federal authorities for the project. In all other cases, the consultant agrees to assist the city to obtain all necessary permits and approvals from all local, state, and federal authorities for the project.
13. **Scope of Work Deliverable:** If requested by the City, the successful contractor shall prepare and provide its detailed Scope of Work for the project providing its approach for meeting the objectives outlined within the City's Scope of Work. The contractor's Scope of Work shall include the approach, method, format, fee, and timing to complete the project. Contractor's preparation of its Scope of Work shall not be interpreted to be the City's acceptance of the Scope nor of the City's acknowledgement that Contractor's approach shall fulfill the objectives for the project as outlined within the City's Scope of Work unless accepted by the City. Acceptance shall not be construed as overriding the provisions and requirements as contained within the City's Scope of Work.

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14. **Inspection:** All work shall be subject to inspection, surveillance, and test by the City at reasonable times during the performance of the contract. The Consultant shall provide and maintain an inspection system which is acceptable to the City.

15. **Investigation of Conditions:** The Consultant warrants and agrees familiarity of the work that is required, is satisfied as to the conditions under which is performed and enters into this contract based upon the Consultants own investigation.

16. **Acceptance:** Determination of the acceptability of work shall be completed in a responsive and professional manner and in accordance with the specifications, schedules, or plans which are incorporated in the Scope of Work.

17. **Compensation:** Compensation for services shall be based upon fees negotiated, including all approved costs and expenses incurred in connection with the project; including but not limited to, telephone and other communications, reproduction of documents, and special consultants (as approved by the City).

18. **Invoices:** The Consultant shall submit invoices to the City of Peoria Accounts Payable Department, 8401 W. Monroe St, Peoria AZ 85345. Invoices may also be submitted electronically to accountspayable@peoriaaz.gov.

19. **Payments:** The City shall pay the Consultant monthly, based upon work performed and completion to date, and upon submission of invoices. All invoices shall document and itemize all work completed to date. The invoice statement shall include a record of time expended and work performed in sufficient detail to justify payment.

20. **Insurance Requirements:** The Consultant, at Consultant's own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly licensed, possessing a current A.M. Best, Inc. Rating of A-, or approved unlicensed in the State of Arizona with policies and forms satisfactory to the City.

    All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted; failure to do so may, at the sole discretion of the City, constitute a material breach of this Contract.

    The Consultant's insurance shall be primary insurance as respects the City, and any insurance or self-insurance maintained by the City shall not contribute to it.

    Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect coverage afforded under the insurance policies to protect the City.

    The insurance policies, except Workers' Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against the City, its agents, representatives, directors, officers, and employees for any claims arising out of the Consultant's acts, errors, mistakes, omissions, work or service.

    The insurance policies may provide coverage which contain deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to the City under such policies. The Consultant shall be solely responsible for the deductible and/or self-insured retention and the City, at its option, may require the Consultant to secure payment of such deductibles or self-insured retentions by a Surety Bond or an irrevocable and unconditional letter of credit.

    The City reserves the right to request and to receive, within 10 working days, certified copies of any or all of the herein required insurance policies and endorsements. The City shall not be obligated, however, to review same or to advise Consultant of any deficiencies in such policies and endorsements, and such receipt shall not relieve Consultant from, or be deemed a waiver of the City's right to insist on, strict fulfillment of Consultant's obligations under this Contract.

    The insurance policies, except Workers' Compensation and Professional Liability, required by this Contract, shall name the City, its agents, representatives, officers, directors, officials and employees as Additional Insureds.

21. **Required Insurance Coverage:**

    a. Commercial General Liability

       Consultant shall maintain Commercial General Liability insurance with a limit of not less than $1,000,000 for each occurrence with a $2,000,000 Products/Completed Operations Aggregate and a $2,000,000 General Aggregate Limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products and completed

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operations and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of this Contract which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 00011207 or any replacements thereof. The coverage shall not exclude X, C, U.

Such policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, nor any provision which would serve to limit third party action over claims.

The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc.'s Additional Insured, Form B, CG 20370704, and shall include coverage for Consultant's operations and products and completed operations.

If required by this Contract the Consultant subletting any part of the work, services or operations awarded to the Consultant shall purchase and maintain, at all times during prosecution of the work, services or operations under this Contract, an Owner's and Consultant Protective Liability insurance policy for bodily injury and property damage, including death, which may arise in the prosecution of the Consultant's work, service or operations under this Contract. Coverage shall be on an occurrence basis with a limit not less than $1,000,000 per occurrence, and the policy shall be issued by the same insurance company that issues the Consultant's Commercial General Liability insurance.

b. Automobile Liability

Consultant shall maintain Commercial/Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than $1,000,000 each occurrence with respect to the Consultant's any owned, hired, and non-owned vehicles assigned to or used in performance of the Consultant's work. Coverage will be at least as broad as coverage code 1, "any auto", (Insurance Service Office, Inc. Policy Form CA 00010306, or any replacements thereof). Such insurance shall include coverage for loading and off loading hazards.

c. Workers' Compensation

The Consultant shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Consultant's employees engaged in the performance of the work or services; and, Employer's Liability insurance of not less than $100,000 for each accident, $100,000 disease for each employee, and $500,000 disease policy limit.

In case any work is subcontracted, the Consultant will require the Subcontractor to provide Workers' Compensation and Employer's Liability to at least the same extent as required of the Consultant.

d. Professional Liability

The Consultant retained by the City to provide the work or service required by this Contract will maintain Professional Liability insurance covering acts, errors, mistakes and omissions arising out of the work or services performed by the Consultant, or any person employed by the Consultant, with a limit of not less than $1,000,000 each claim.

22. **Certificates of Insurance:** Prior to commencing work or services under this Contract, Consultant shall furnish the City with Certificates of Insurance, and formal endorsements as required by the Contract, issued by Consultant's insurer(s), as evidence that policies providing the required coverages, conditions and limits required by this Contract are in full force and effect.

    In the event any insurance policy(ies) required by this contract is(are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of the Consultant's work or services and as evidenced by annual Certificates of Insurance.

    If a policy does expire during the life of the Contract, a renewal certificate must be sent to the City fifteen (15) days prior to the expiration date.

    All Certificates of Insurance required by this Contract shall be identified with a bid or contract number and title of the project.

23. **Cancellation and Expiration Notice:** Insurance required herein shall not expire, be canceled, or materially changed with respect to coverage or rating of carrier. All other changes shall be with thirty (30) days prior written notice to the City.

24. **Independent Contractor:**

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a. General

i. The Consultant acknowledges that all services provided under this Agreement are being provided by him as an independent Consultant, not as an employee or agent of the City Manager or the City of Peoria.

ii. Both parties agree that this Agreement is nonexclusive and that Consultant is not prohibited from entering into other contracts nor prohibited from practicing his profession elsewhere.

b. Liability

i. The City of Peoria shall not be liable for any acts of Consultant outside the scope of authority granted under this Agreement or as the result of Consultant's acts, errors, misconduct, negligence, omissions and intentional acts.

c. Other Benefits

The Consultant is an independent Consultant, therefore, the City Manager will not provide the Consultant with health insurance, life insurance, workmen's compensation, sick leave, vacation leave, or any other fringe benefits. Further, Consultant acknowledges that he is exempt from coverage of the Comprehensive Benefit and Retirement Act (COBRA). Any such fringe benefits shall be the sole responsibility of Consultant.

25. **Key Personnel:** It is essential that the Consultant provide adequate experienced personnel, capable of and devoted to the successful accomplishment of work to be performed under this contract. The Consultant must agree to assign specific individuals to the key positions.

a. The Consultant agrees that, once assigned to work under this contract, key personnel shall not be removed or replaced without written notice to the City.

b. If key personnel are not available for work under this contract for a continuous period exceeding 30 calendar days, or are expected to devote substantially less effort to the work than initially anticipated, the Consultant shall immediately notify the City, and shall, subject to the concurrence of the City, replace such personnel with personnel of substantially equal ability and qualifications.

26. **Confidential Information:**

a. If a person believes that a bid, proposal, offer, specification, or protest contains information that should be withheld, a statement advising the Materials Manager of this fact shall accompany the submission and the information shall be identified.

b. The information identified by the person as confidential shall not be disclosed until the Materials Manager makes a written determination.

c. The Materials Manager shall review the statement and information and shall determine in writing whether the information shall be withheld.

d. If the Materials Manager determines to disclose the information, the Materials Manager shall inform the person in writing of such determination.

27. **Identity Theft Prevention:** The Contractor shall establish and maintain Identity Theft policies, procedures and controls for the purpose of assuring that "personal identifying information," as defined by A.R.S. § 13-2001(10), as amended, contained in its records or obtained from the City or from others in carrying out its responsibilities under the Contract, is protected at all times and shall not be used by or disclosed to unauthorized persons. Persons requesting such information should be referred to the City. Contractor also agrees that any "personal identifying information" shall not be disclosed other than to employees or officers of Contractor as needed for the performance of duties under the Contract. Contractor agrees to maintain reasonable policies and procedures designed to detect, prevent and mitigate the risk of identity theft. Contractor is required under this contract to review the City of Peoria's Identity Theft Program and to report to the Program Administrator any Red Flags as defined within that program. At a minimum, the contractor will have the following Identity Theft procedures in place:

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a. Solicit and retain only the "personal identifying information" minimally necessary for business purposes related to performance of the Contract.

b. Ensure that any website used in the performance of the contract is secure. If a website that is not secure is to be used, the City shall be notified in advance before any information is posted. The City reserves to right to restrict the use of any non-secure websites under this contract.

c. Ensure complete and secure destruction of any and all paper documents and computer files at the end of the contracts retention requirements.

d. Ensure that office computers are password protected and that computer screens lock after a set period of time.

e. Ensure that offices and workspaces containing customer information are secure.

f. Ensure that computer virus protection is up to date.

28. **Confidentiality of Records:** The Consultant shall establish and maintain procedures and controls that are acceptable to the City for the purpose of assuring that information contained in its records or obtained from the City or from others in carrying out its functions under the contract shall not be used or disclosed by it, its agents, officers, or employees, except as required to efficiently perform duties under the contract. Persons requesting such information should be referred to the City. Consultant also agrees that any information pertaining to individual persons shall not be divulged other than to employees or officers of Consultant as needed for the performance of duties under the contract. These provisions shall not restrict the Design Professional from giving notices required by law or complying with an order to provide information or data when such order is issued by a court, administrative agency or other authority with proper jurisdiction.

29. **Ordering Process:** Upon award of a contract by the City of Peoria, Materials Management Division may procure the specific service awarded by the issuance of a purchase order to the appropriate Consultant. The award of a contract shall be in accordance with the City of Peoria Procurement Code and all transactions and procedures required by the Code for public bidding have been complied with. A purchase order for the awarded service that cites the correct contract number is the only document required for the department to order and the Consultant to delivery the service.

    Any attempt to represent any service not specifically awarded as being under contract with the City of Peoria is a violation of the contract and the City of Peoria Procurement Code. Any such action is subject to the legal and contractual remedies available to the City inclusive of, but not limited to, contract cancellation, suspension and/or debarment of the Consultant.

30. **Billing:** All billing notices to the City shall identify the specific item(s) being billed and the purchase order number. Items are to be identified by the name, model number, and/or serial number most applicable. Any purchase/delivery order issued by the requesting agency shall refer to the contract number resulting from this solicitation.

31. **Licenses:** Consultant shall maintain in current status all Federal, State and Local licenses and permits required for the operation of the business conducted by the Consultant as applicable to this Contract.

32. **City of Peoria Business License:** Peoria City Code requires that all persons conducting business in the City of Peoria must first obtain a license. This includes businesses within the Peoria city limits, or those outside the limits who conduct business or perform services within Peoria. For business license questions or to obtain a license, please contact the City of Peoria Sales Tax & License Division at (623) 773-7160 or via email at salestax@peoriaAZ.gov.

33. **Business in Arizona:** The City will not enter contracts with foreign corporations not granted authority to transact business, or not in good standing, in the state of Arizona by the Arizona Corporation Commission. Businesses outside of Arizona may file documents to obtain a business license from the Arizona Corporation Commission. Information is available on the Arizona Corporation Commission's website at https://www.azcc.gov for more information. Businesses are cautioned the processing time can be lengthy.

34. **Contract Termination:** Any contract entered into as a result of this Solicitation is for the convenience of the City and as such, may be terminated without default by the City by providing a written thirty (30) day notice of termination.

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35. **Cancellation:** The City reserves the right to cancel the whole or any part of this contract due to failure by the Consultant to carry out any obligation, term or condition of the contract. The City will issue written notice to the Consultant for acting or failing to act as in any of the following:

    a. The Consultant provides material that does not meet the specifications of the contract;

    b. The Consultant fails to adequately perform the services set forth in the specifications of the contract;

    c. The Consultant fails to complete the work required or to furnish the materials required within the time stipulated in the contract;

    d. The Consultant fails to make progress in the performance of the contract and/or gives the City reason to believe that the Consultant will not or cannot perform to the requirements of the contract.

    Upon receipt of the written notice of concern, the Consultant shall have ten (10) days to provide a satisfactory response to the City. Failure on the part of the Consultant to adequately address all issues of concern may result in the City resorting to any single or combination of the following remedies:

    a. Cancel any contract;

    b. Reserve all rights or claims to damage for breach of any covenants of the contract;

    c. Perform any test or analysis on materials for compliance with the specifications of the contract. If the results of any test or analysis find a material non-compliant with the specifications, the actual expense of testing shall be borne by the Consultant;

    d. In case of default, the City reserves the right to purchase materials, or to complete the required work in accordance with the City Procurement Code. The City may recover any actual excess costs from the Consultant by:

        i. Deduction from an unpaid balance;

        ii. Or any other remedies as provided by law.

36. **Contract Default:** The City, by written notice of default to the contractor, may terminate the whole or any part of this contract in any one of the following circumstances:

    a. If the contractor fails to make delivery of the supplies or to perform the services within the time specified; or

    b. If the contractor fails to perform any of the other provisions of this contract; and fails to remedy the situation within a period of ten (10) days after receipt of notice.

    In the event the City terminates this contract in whole or part, the City may procure supplies or services similar to those terminated, and the contractor shall be liable to the City for any excess costs for such similar supplies or services.

37. **Project Travel Reimbursable Expenses:** If travel expenses are allowed as part of the contract the reimbursable expenses will be as follows. All expenses will be billed to the City at cost without markup. Copies of bills for expenses are to be submitted with the invoice. Travel time to and from job site is excluded from this contract. There will be no allowances for parking or personal car mileage. No incidentals for travel of any kind are allowed under this contract.

    The following is a list of allowable travel expenses under this contract agreement:

    a. Transportation:

        i. Air Transportation – coach class fares, minimum 14 days advanced purchase, unless otherwise agreed upon.

        ii. Car Rental – mid size car, gas for rental car (City assumes no liability regarding additional insurance costs).

    b. Lodging and Meals:

        i. Meals – three meals per day, at the current federal per diem rate for Maricopa County.

        ii. Lodging – not to exceed the current federal rate for Maricopa County. Vendors are encouraged to stay in hotels located within the City of Peoria when practical. A listing of accomodations within Peoria can be found on the

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following website: https://www.visitpeoriaaz.com/local-amenities/where-to-stay

38. **Protest Policy and Procedures:** The City of Peoria protest policy and procedures are available for review at the following public websites.

    a. The City of Peoria Protest Policy and Procedures are available online at https://www.peoriaaz.gov/government/city-law/city-code. The policy is contained within the City of Peoria Procurement Code, Chapter 26 - Administration, section 26-121. Procurement Code Protests; Informal and Formal.

    b. The specific protest procedures are contained in the Materials Management "Procurement Guidelines" and can be accessed at http://www.peoriaaz.gov/procurement.

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I. PURPOSE

The City of Peoria is seeking proposals from qualified firms or individuals (Consultants) to provide professional services related to Advanced Metering Infrastructure (AMI) in the utility industry. The Consultant selected will perform all necessary tasks to assist the City in determining the feasibility of a successful AMI system throughout the City's water service areas.

The recommended systems must work in conjunction with the current Computer Information System (CIS).

The City intends to make a single award. The Consultant selected and awarded a contract resulting from this RFP must remain brand agnostic throughout the engagement and will not have the ability to submit a proposal for an AMI System or have any direct involvement with vendors submitting proposals for an AMI System.

II. BACKGROUND

The City of Peoria, Arizona (City) is located in Maricopa and Yavapai County and just fifteen (15) miles west of Phoenix. With a population of nearly 191,000, Peoria is the 146th largest city in the United States and ninth largest in Arizona.

Peoria encompasses 179.25 square miles inside a 21-city region that has a population of 4.3 million people with projected growth to 6 million by 2030.

The City is currently using Northstar Customer Information and Utility Billing System, commonly referred to as our Computer Information System (CIS) along with Invoice Cloud SAS solution for online portal and payment processing.

The City has approximately 1,037 miles of waterline servicing approximately 62,700 connections and meters for residential, commercial, irrigation, fire services and hydrants ranging in sizes from three-quarters of an inch (¾") to ten inches (10"). Meters are read via an Automated Meter Reading (AMR) system with individual collectors in the meter technician's vehicles. Data from the meter read is uploaded remotely into the CIS for analysis and billing. The City completed two-meter change-out projects in January 2016 and January 2018 for 39,000 and 7,200 meters respectively. A third meter change-out project kicked off in February 2022 for 1,300 meters. Peoria currently uses Neptune meters. With these change-out projects, the average meter age is 6.4 years.

III. MINIMUM QUALIFICATIONS

Successful firm at a minimum shall:

A. Display a minimum of three (3) years of experience successfully consulting and planning water meter AMI projects;

B. Demonstrate recent experience with similar studies.

C. Demonstrate that they have successfully consulted on systems of similar size and complexity to the City of Peoria.

D. Have experience with water metering.

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IV. SCOPE OF WORK

A. Objectives - This project has multiple objectives as outlined below. The successful Consultant must demonstrate that they can best assist the City in meeting these objectives:

1. Through site visits and on-site interviews, evaluate current equipment and systems, identify the immediate and long-term needs for development of a water meter AMI program, and provide a report detailing a recommended system and program.
2. Understand utilities current best practices, distribution delivery system trends, and how best to apply them to the City's environment.
3. Complete detailed analysis of AMI vendors and systems that will best satisfy business needs, offer long-term viability, and are suited to the City's utility infrastructure.
   a. The AMI System recommendations must include an accompanying platform/portal, integrated or stand-alone with an interface(s), with internal (City Staff) and external (Water Utility Customers) access to consumption analytics, behavior-based management and personalized insights.
4. Develop a product acquisition strategy and specifications for competitive selection.
5. Develop a strategy for phasing project management of the AMI program to City staff at a defined project benchmark.
6. Recommend new and/or improved existing workflows, features and systems to increase operational efficiencies within the Utility.
7. Provide a staffing analysis detailing the current technical staff structure at City of Peoria and its suitability to support an implementation program of this size and complexity. This analysis would include recommendations for changes in staff tasking and staffing levels throughout project implementation and after project completion, i.e., during on-going maintenance and operations.

B. Services Required - The Consultant will be expected to work closely with the City's Project Team:

1. Perform a needs assessment study to determine the current and future technology and infrastructure needs for the City. The needs assessment will include, but not limited to, Radio Frequency (RF) propagation and topography analysis of the city with recommendations for receiving infrastructures that meets the Peoria City Code requirements for height and size that will maximize the frequency range.
2. Review the City's current meter replacement(s) project and make recommendations to improve the plan(s) based on industry best practices e.g., American Water Works Association (AWWA) M36 Water Audits and Loss Control Programs and best practices for implementation plans.
3. Evaluate and summarize the feasibility of AMI alternatives to meet water business needs.
4. Develop an AMI Business Case for the City to include all benefits and costs applicable to an AMI implementation:
   a. Cost-and-benefit analysis presented in the updated Business Case should incorporate a full system pricing mechanism that includes life cycle equipment and operating costs, operating savings, associated cash flows, inflation, and other considerations and constraints based on available information;
   b. Outline the differences in the estimated costs and benefits, strengths and weaknesses, intangible and definitive benefits e.g., enhanced data for cost of service studies, rate design, conservation targeting and infrastructure master planning and risks; and
   c. Assess and report on the organizational impact of potential AMI solutions on applicable City business processes, personnel, and technology.
5. Evaluate applicable existing City IT hardware and software systems for required interface with AMI. Identify related Meter Data Management (MDM) system hosting options and make recommendations.

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6. Prepare a comprehensive process-mapping document that identifies the data flow process within the City. This should include workflow diagrams and related text for the City's existing system/process and new system/process.
7. Analyze the current system redundancy for fault tolerance and recommend system specifications that include system redundancy.
8. Determine the requirements and provide a recommendation for disaster recovery, backup, and business continuity.
9. Identify the type and amount of hardware, software, connectivity and other key infrastructure components necessary to maintain acceptable operations.
10. Quantify specific operational benefits to be realized through technology implementation, such as leak detection, outage management, IVR, remote connect/disconnect, etc.
11. Identify qualified technology vendors and architectures that will meet the City's needs, including assessment of their long-term viability.
12. Identify technology alternatives that present reasonable options for the City.
13. Educate the City about the functionalities of systems available in the market, highlight the advantages and disadvantages of each system and how each system can drive operational benefits.
14. Prepare a report to present to City management for review, which could include pilot project recommendations.
15. Recommend an appropriate scope and detailed strategy for the project including timelines and phasing for procurement of supplies, infrastructure deployment, and system testing.
16. Develop a budget projection and timeline for the proposed project (includes a timeline for each milestone).
17. Recommend resource plan requirements that take in to account all the resources (staff, space, equipment support, etc.) required for initial system setup/management for all proposed solutions.
18. Develop and update system documents where needed.
19. Work with the City to create specifications for the procurement of an AMI System.

SUBMITTAL REQUIREMENTS

Solicitation Number: **P23-0013**

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I. QUESTIONS:

All questions regarding the solicitation should be sent in writing to the designated purchasing agent via email or through Messages/Opportunity Q&A on the City of Peoria's Purchasing Portal (Bonfire).

The designated purchasing agent for this solicitation is:

Terry Andersen, Contract Officer
Phone: (623) 773-7981
Email: Teresa.Andersen@peoriaaz.gov

All questions must be submitted no later than the date and time indicated on the City of Peoria's Purchasing Portal (Bonfire).

Contact with City staff, other than the designated contact person indicated in the RFP, regarding this solicitation is strictly prohibited during the proposal process.

II. PROPOSAL DUE DATE:

Proposals are due no later than **5:00 P.M**. on **November 29, 2022**, unless the RFP is otherwise extended or cancelled via formal Solicitation Amendment.

III. INSTRUCTIONS FOR PREPARING AND SUBMITTING RESPONSE:

A. Proposals shall be submitted through the City of Peoria's Purchasing Portal (Bonfire) website at https://peoriaaz.bonfirehub.com/portal under the appropriate solicitation opportunity. Submissions submitted elsewhere or under the wrong solicitation will not be considered.

B. Solicitation Amendments: Any changes to the solicitation document will be in the form of a Solicitation Amendment. Amendments are posted on the City of Peoria's Purchasing Portal (Bonfire) website at https://peoriaaz.bonfirehub.com/portal under the appropriate solicitation opportunity. Interested parties are cautioned to check the Purchasing Portal (Bonfire) for amendments prior to submitting their proposal. The City will not be held responsible if a vendor fails to receive any amendments issued.

The City shall not be responsible for any oral changes to the scope of work or specifications made by any employees or officer of the City and interested parties are cautioned not to rely on any such changes.

IV. PROPOSAL CONTENT: The following items shall be addressed in the proposal:

A. Project Understanding & Approach

- Provide a description of the plan and approach your firm will utilize in delivery of services. This should tell how/why this approach will achieve success on the project. Include any potential items of risk, solutions to the identified risks and any valued added options that may apply to the project.
- Identify the involvement of the City for which your firm sees as essential for successful completion of the project.
- Project Schedule to complete the work.

B. Staff Capabilities and Assignments

- Identify the key members of the team their specific roles.

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- Demonstrate the experience and capabilities of each key member including professional qualifications necessary to perform the task and required services successfully.
- Provide the qualifications and experience of all sub consultant(s), including their proposed specific areas of responsibility, as required to demonstrate their ability to perform the tasks required.
- Location of the offices performing the services

C. Firm Experience & Similar Projects

- Provide a description of the firm's experience with similar types of work
- Identify similar projects to include contract value and indicate if projects were completed on schedule and within budget.
- Provide at least three (3) owner references from projects completed within the past 3 years.

D. Cost Considerations

- Offeror to submit Fee Schedule to include Tasks, number of hours and hourly rates for each individual providing services.
- Include any travel related expense, if applicable.

E. Conformance to RFP:

- Failure to provide all requested information may result in the proposal being rejected as non-responsive.
- Complete and return all City forms.
- Exceptions – Any exceptions to any part of the RFP must be clearly noted and identified.

V. EVALUATION CRITERIA: In accordance with the City of Peoria Procurement Code, awards shall be made to the responsible offeror whose proposal is determined in writing to be the most advantageous to the City, based upon the evaluation criteria listed below. The evaluation factors are listed in their relative order of importance.

A. Project Understanding & Approach
B. Staff Capabilities and Assignments
C. Firm Experience & Similar Projects
D. Cost Considerations
E. Conformance to Request for Proposal

The City reserves the right to consider historic information and facts, whether gained from the Offeror's proposal, questions and answer conferences, references, or other source and the views of the evaluator(s) with prior Contract or service delivery experience with any of the Offerors, while conducting the proposal evaluations.

Materials Management
Procurement
9875 N. 85th Avenue
Peoria, Arizona 85345-6560
Phone: (623) 773-7115
Fax: (623) 773-7118

Offeror acknowledges that NO changes to the City's Insurance Requirements, Indemnification and Document Use requirements will be granted, and that any changes or modifications requested may result in the offeror's proposal being considered non-responsive.

☒ Yes ☐ No *If no, give reason below*

Offeror acknowledges acceptance of the City of Peoria's Standard Terms and Conditions and Special Terms and Conditions and takes no exceptions.

☒ Yes ☐ No *If no, give reason below*

Offeror acknowledges acceptance of the City of Peoria's Scope of Work and/or Specifications and Submittal Requirements and takes no exceptions.

☒ Yes ☐ No *If no, give reason below*

Has your firm been certified by any jurisdiction in Arizona as a minority or woman owned business enterprise? Yes_____, No__X_____.

If yes, please provide details and documentation of the certification.

GHD Digital

Consulting Services for Advanced Metering Infrastructure (AMI)

Solicitation P23-0013

Peoria, Arizona

November 29, 2022

→ **The Power of Commitment**

4747 N. 22nd Street, Suite 200
Phoenix, Arizona 85016
United States
www.ghd.com

Peoria ref: P23-0013
GHD ref: 12599338

November 29, 2022

Terry Andersen
City of Peoria – Materials Management Procurement
9875 N. 85th Street
Peoria, Arizona

Consulting Services for Advanced Metering Infrastructure (AMI)

Dear Members of the Evaluation Committee:

GHD has enclosed our qualifications to provide Advanced Metering Infrastructure (AMI) Consulting Services to the City of Peoria Materials Management (City). Through this solicitation, the City is presenting GHD with an opportunity to assist you with your AMI Project. Selecting GHD will bring the City a robust and solid team with capabilities to deliver all the tasks required in the Request for Proposal (RFP) and issued Addenda to assist with vendor selection. GHD will help the City with this transformational investment that AMI establishes when utilized, as it drives value across all business dimensions. By focusing on outcomes and value creation, we dramatically surpass the traditional metering process, helping the City become an industry trail blazer on enhanced customer relations and enable new services while increasing efficiency, preparedness, reliability, and security, and providing greater visibility and control of assets.

The key qualifications that GHD has to offer the City include:

- **AMI Solutions that Meet Today's and Tomorrow's Needs.** We will work with the City to implement an AMI system that goes beyond efficient meter reading and billing. A next-generation AMI system will help the City embrace new business models, shift the operating paradigm from reactive to proactive, and improve the efficiency of the water distribution system – with it becoming a catalyst for an enhanced customer relationship. With this established efficiency the City will be able to reduce time reading meters; that time could be allocated to assisting the operations department in the maintenance of the water system.
- **Demonstrated understanding of community.** GHD understands the City prides itself on serving its community, and we see this project as an opportunity to provide enhance services to your residents. GHD has a reputation for providing its clients innovative solutions, and we will aspire to utilize our experience to give the City and its residents an outcome for this project that benefits both parties.
- **Firm reputation.** At GHD, our mission is ***"Together with our clients, to create lasting community benefits."*** We are connected to our clients, responsive to their needs, and insightful about the concerns of their communities. This is an advantage for the City because we understand not every project is the same and our team has the flexibility to respond to the City's needs first and foremost.
- **Size of Firm.** GHD operates under a "One GHD" approach; we will pull resources as needed to bolster project teams for the benefit of our clients. In the West, GHD maintains 16 offices, which allows us to draw upon a deep well of resources to respond quickly to any project challenge.

- **Project Leads.** The GHD team will be led by Project Manager Richard Relyea and Project Director Freddie Guerra. Together they have over 50 years of experience leading and supporting all aspects of meter replacement and AMI system feasibility studies, business cases, deployment, alternative delivery, and more. Freddie Guerra has played a key role in projects that focused on the survivability of AMI systems and "Going Beyond AMI" to enable modern technologies for greater visibility and real-time control for new business benefits. Both Richard Relyea and Freddie Guerra have used their expertise to develop innovative solutions to various clients for AMI projects.
- **Project Team**. Our project team includes Edgar Johnson and Jose Diaz-Mendez, both of whom have extensive experience providing water meter and AMI services, including management, assessment, and plan implementation, to clients. They will be assisted by our Key Client Relationship Manager/ Strategic Support, Mike Worlton, a licensed Arizona P.E., who for more than 25 years has been actively involved in directing, managing, and designing water projects throughout Arizona, including with the City of Peoria. These individuals will be supported by our additional staff, presented in our Organizational Chart, and will be able to effectively apply best practices to the City to create an AMI foundation that is scalable, flexible, and capable of delivering value to all parties. Due to their unique qualifications, our team understands that each county has different requirements and will be able to mitigate between the City and the county when necessary for this project.
- **Availability and Capacity.** Project Manager Richard Relyea carefully considered current and projected workload as well as breadth of expertise needed when selecting the right team for this contract. Richard has over 85% availability for this pursuit and is ready to work with the City.

GHD is committed to helping maintain the City's unique sense of place and economic vitality while preserving its history, diversity, and natural beauty. We are solution oriented and will use our considerable talents and resources as the foundation for assisting the City in meeting its AMI consulting needs. We appreciate the opportunity to submit our qualifications for the City's consideration and provide our services.

Regards,

Mike Worlton
Business Group Leader, Key Client Relationship Manager
+1 602-216-7200
michael.worlton@ghd.com

Richard Relyea
Project Manager
+1 916-205-6510
richard.relyea@ghd.com

Contents

Appendices

90+ years in operation
135+ countries served
160+ offices worldwide
1.7Ⓑ USD revenue 2022
5 global markets
11Ⓚ people
45+ service lines

↳ **Providing engineering, environmental, advisory, architecture, digital and construction services**

About GHD

Established in 1928 and privately owned by our people, GHD is a corporation that operates across five continents and employs over 10,000 people in more than 200 offices to deliver projects with high standards of safety, quality, and ethics across the entire asset-value chain. GHD operates in the global markets of water, energy and resources, environment, property and buildings, and transportation. More information about GHD can be found at: ***www.ghd.com***.

GHD's Integrated AMI Consulting Services

Over the past two decades, Advanced Metering Infrastructure (AMI) has changed the face of the utility industry – eliminating or reducing manual meter readings, improving interval data capabilities, and enabling two-way communication between electricity providers and consumers.

While these capabilities were groundbreaking at the time of deployment, many first-generation components now lack the digital and technological maturity needed to adequately address the challenges of the current business landscape.

In response to these evolving challenges, GHD created a specialized **AMI Consulting Services** offering to help cities design, build, and integrate an advanced metering system enabling AMI refresh and initial deployments. The offering incorporates smart metering, smart analytics, and smart grid capabilities to drive organizational efficiency, enable new services, and address a wide range of complex regulatory, environmental, and security challenges. The AMI Consulting Services team integrates water and digital specialists from across GHD's global footprint.

Next-generation AMI builds upon the original promise of the metering infrastructure. It incorporates data, advanced analytics, and intelligent automation applications to further improve operational efficiency, including reduced costs for metering and billing, faster responses to outages, and improved safety. The business benefits of the initial deployments focus on improving customer experience while Next-Gen AMI unlocks cities' operations benefits.

Cities that choose to employ a second wave deployment of AMI enable a shift in operating paradigm from reactive to proactive – scanning, identifying, and addressing issues proactively rather than reacting to customer calls or when failures occur.

By focusing on outcomes and value creation, we dramatically surpass the traditional metering process, helping cities enable new services while also increasing efficiency, preparedness, reliability, and security while providing greater visibility and control of assets.

City of Peoria is a GHD Key Client

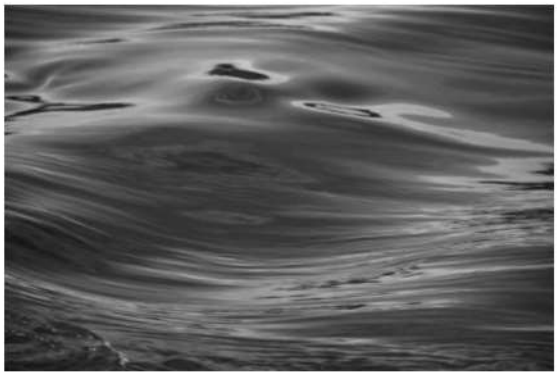
Key Client Relationship Manager Mike Worlton, a licensed Arizona PE based in GHD's Phoenix office, has been actively involved in directing, managing, and designing water projects throughout Arizona, including with the City of Peoria, for more than 26 years. Mike will be available to assist the City with whatever it needs throughout the duration of this project as well as provide strategic support for GHD's project team.

Mike Worlton, PE
Phoenix Office

Qualifications/Accreditations | MS, Civil Engineering, Brigham Young University, Provo, UT, 1997; BS, Civil Engineering, Brigham Young University, Provo, UT, 1996; Civil Engineer, AZ #35265, CA #60146, UT #324120-2202, TX #108034, NM #22639; Certified Professional in Board Certified Environmental Engineer

Project Role | Mike will serve as Key Client Relationship Manager and will work toward greater understanding of City business objectives, collaborate with the City, and identify where GHD and the City together can provide solutions using a client-centric approach. Mike will also provide strategic support to the team based on his expertise in the water industry in Arizona.

In addition to Mike, GHD has more than 75 staff in the Phoenix area with expertise in water planning, design, and operations throughout the state.



AMI Implementation Project

It will be critical for the City's AMI implementation project to be based on a thorough understanding of existing assets, service areas, staff needs, preferences, and financing options. GHD has developed proven tools and approaches to address these issues.

1. Project Understanding and Approach

The City has a large number of residential and commercial meters serving a diverse geographic area. The existing automatic meter reading (AMR) system does not cover the entire service area and decisions must be made soon relative to the feasibility of continuing the current path with an aging AMR legacy system or pursuing other alternatives. This decision will require a good understanding of the existing Neptune meter population, current capabilities and limitations of the existing AMR system, and consideration of alternative approaches, based on topography and potential efficiency gains that can be realized by eliminating manual reading for most of the existing meters. GHD has an intimate understanding of Neptune meters and both their drive-by meter reading software and their AMI capabilities. We understand the benefits of maintaining existing assets while recognizing there are other systems available that can read the Neptune meters using radio frequency (RF) technology, some of which have longer ranges and improved capabilities.

We understand that the City has embarked on a meter replacement program, replacing approximately 75% of the meter population with Neptune positive displacement meter and a Neptune AMR read system. The lack of a comprehensive AMI read system for all meters has made it difficult to realize benefits of the existing AMR system and the units are not readily compatible with proposed newer AMI systems offered by Neptune. As the City faces future challenges of collecting reads using drive-by equipment, the prospect of comprehensive register and endpoint changeout strategies, coupled with consideration of other reading solutions, warrants good decision-making practices and analysis.

It will be critical for the City's AMI implementation project to be based on a thorough understanding of existing assets, service areas, staff needs, preferences, and financing options. GHD has developed proven tools and approaches to address these issues. The goal of our analysis will be to effectively convey costs and benefits so that all stakeholders support the project and work together toward successful implementation. Once this support is achieved, the challenge of completing the effort as efficiently as possible – with minimal impacts to existing staff, operations, and customers –must be considered.

The largest investment in the City's future AMI system is associated with the cost of meters, appropriate registers, and endpoints. For a successful project it is imperative for the City to obtain reliable meter reads with a reasonable number of collectors that are strategically located. The reliance on a cellular network provider must be carefully evaluated considering the costs and benefits of deploying a private network. While head-end software and related functionality is important, it can be rendered ineffective if endpoints fail to effectively report reads over the life of the meter and communication system. Software can be updated and improved; however, an ineffective endpoint, or a partially completed system, can become ongoing liabilities rather than assets. Recurring software costs, ongoing service and maintenance fees, and hidden charges must also be identified and mitigated both at the planning and RFP stages.

»Our Scope of Work lays out a proven and logical progression we have found to be successful with similar projects.

A collaborative approach will be applied while engaging City staff to complete the Scope of Work. «

Key Tasks and Concepts for Completing the Project

- **Meter Data Collection |** We typically obtain all available GIS data and customer billing data using standard questionnaires designed to quickly convey an understanding of existing meters (including age, accuracy, and throughput) as well as related installation, retrofit, and/or replacement needs. Clear and concise maps are presented in our report that help illustrate the ultimate project and phasing plan. We have found that generating an understanding of the spatial distribution of meters is critical in the real business case, and GIS-based maps are an excellent way to convey this.
- **Technology Review |** Our team is active in the American Water Works Association (AWWA) meter, water loss, and new technology committees, including holding multiple board positions, and stays abreast of both proven and emerging technologies so that all viable options are communicated clearly with the City. Our team also has decades of international experience evaluating water meters, their efficiency, and the technology to read those meters.
- **Financial Analysis |** To the extent any older, inefficient meters are changed out as part of the project, there may be an increase in future revenues. We often rely on the AWWA water audit tool to help monetize Real and Apparent Losses coupled with a thorough understanding of existing water rates, labor requirements, and financing options to quickly zero in on the monetary benefits of new meters and AMI. Here again, we have a set of standard questionnaires that help quickly evaluate various metrics used in the analysis. Available grants, financing options, and projected interest rates are considered in the business case feasibility.
- **Social and Environmental Benefits |** Non-monetary benefits of AMI may become a driving force for this project. GHD will rely on standard approaches and questionnaires that help quickly identify often elusive, but important, considerations.
- **Risk Analysis |** With any new technology, associated risks must be considered. Our analysis will present these while working in cooperation with City staff to shed light on these factors so appropriate mitigation can be identified.

The timeline for the proposed feasibility study is typically around four (4) months and will be determined and finalized during the kick-off meeting as discussed in **Task 2.1** (**see page 6**). The completion time is dependent, in part, on the time required to obtained requested information as described below.

A collaborative approach will be applied while engaging City staff to complete the scope of work. This effort will begin with submission of several GHD standard data requests at the onset of the project followed by focused work groups to review and clarify the City's responses. Our team has developed a variety of tools to efficiently facilitate this communication, including the following:

- A customer meter data request to be completed by the City that includes an Excel or CSV file with addresses, meter sizes, register and radio information, billing history, and related statistics
- Requested locations of all existing City assets that could help facilitate communications for collector sites; this data will be used for a preliminary propagation study
- A meter reading staff data request form that includes specifics on the number of staff involved in manual reads, drive-by readings, current costs and wages, vehicle usage, and related information associated with current practices
- Our standard customer service data request, which includes estimated hours for various staff functions associated with current billing and customer service-related staff time

As described below in **Section 1.1 Proposed Approach**, we typically engage key City staff in a series of workshops, either in-person or via conference call, aimed at completing the above data requests while zeroing in on other issues. Prior to these workshops we will meet with City staff to confirm the proposed retrofit strategy for completing the system. The analysis will include assessing non-monetary considerations that will be discussed in the workshop setting to identify the relative importance of various items associated with environmental and social benefits as well as procurement and implementation risk factors and related mitigation strategies for the proposed AMI project.

Upon completion of a draft report, GHD will solicit review comments from the City and conduct a follow-up meeting to review responses prior to completing the final feasibility study and findings. Input from the City will include preferred method of financing the proposed improvements as well as confirmation of various financial criteria used in the cost/benefit analysis.

Because the City has already made a significant investment in adding Neptune R900 radios to most meters, the decision to implement AMI will likely be driven to a large degree by the cost of adding a sufficient number of collectors to obtain the desired read reliability. Typical coverage areas claimed by Neptune indicate that a given collector can cover approximately ten (10) square miles. Based on a service area of 179 square miles, this would equate to an estimated 20 collectors. The relatively flat topography in the area would likely result in more collectors than what might be realized given a few strategically located high sites or towers. The restrictions on antenna height within the City is also a consideration when determining the range of a collector. In some instances, leasing from pre-existing towers can be achieved while providing better line of sight and fewer collectors. Other meter reading systems – such as the Sensus Flexnet AMI – can provide greater coverage for a given collector but the cost of adding new endpoints may be cost prohibitive for converting.

GHD will prepare maps and current cost estimates to provide reasonable planning level budgets for completing the system and converting any pre-existing incompatible radios. The Neptune R900 radios can provide dedicated fixed-base communications if enough line-of-sight is maintained for obtaining reliable reads. Badger cellular also provides a cellular AMI solution; however, monthly cellular fees can be cost prohibitive and the cost to retrofit existing endpoints is likely prohibitive. Our study will look at multiple AMI systems to obtain the best AMI product for the City.

Aside from the physical limitations for communications driving the need for multiple collectors, there will be inherent advantages to implementing AMI. Our business case will begin with obtaining a thorough understanding of existing assets and continue with a focus of highlighting the benefits of AMI over AMR and the implications of relying on a cellular network provider with new endpoints like the Badger cellular system.

1.1 Project Approach

We have prepared the tasks below based on our project experience and specific requests found in the City's RFP. All questions posed in the RFP, and more, will be addressed in a final "AMI System Assessment Report." The scope and fee are negotiable and can be adjusted to meet the City's needs.

Task 1 – Project Management (PM)

This task includes preparing monthly invoices, coordinating with staff, communications with City personnel, and miscellaneous correspondence. A duration of four (4) months total is assumed for the project with four (4) hours per month budgeted for PM services and two (2) hours per month for administrative assistance.

Deliverables | Monthly invoices, status reports, and emails as needed to report on project developments

Task 2 – Review of Existing Infrastructure and Processes

Task 2.1 – Project Kick-Off Meeting

An initial kick-off meeting will be held to review the proposed Scope of Work, present our standard forms and data requests, discuss current City data, and review the project schedule, deliverables, and City preferences. This task will also include an initial field survey of typical existing meter, meter box, and City asset locations.

Deliverables | Revised Scope (if necessary) incorporating City preferences along with data request forms, revised schedule, refined list of deliverables and overall approach based on staff input.

Task 2.2 – Existing Systems and Process Review

GHD will conduct interviews with City staff in a working meeting. Existing billing systems, software, and business processes will be reviewed in relation to current meter reading practices. We will provide the City with a standard data request to populate a database that contains critical information on all current meters, registers, existing endpoints, customer addresses, and usage history. This information along with existing GIS data and address locations will be used to prepare maps in an ESRI GIS database for subsequent analysis and presentation.
The data request will include, among other things, existing meter age, type, consumption history, etc. so that, when combined with meter accuracy projections, the potential reduction in Apparent losses through replacement can be evaluated.

Deliverables | Summary of current software, billings systems, and business practices in a separate technical memo that will ultimately be incorporated into the final report. Current customer database with meters sorted and ranked according to size, age, annual consumption, and type as well as GIS maps of service areas and existing read routes.

Task 2 – Review of Existing Infrastructure and Processes (cont.)

Task 2.3 – Existing Meter Asset Evaluation

GHD will work collectively with staff to analyze and document existing small, intermediate, and large meters. The meters will be assessed based on available test data and anticipated AMI retrofits to identify the implications of full-scale AMI deployment. Meter accuracy projections and recommended retrofit needs for the meter population will be summarized, tabulated, and documented based on consideration of concurrent change-out with new meter endpoints after consideration of preferred technologies. If additional meter testing is deemed necessary, we can modify our scope and will work with the meter staff to identify preferred sampling populations for testing either in-house or using outside resources if necessary. This task will also include an additional 2- to 3-day field survey to gain a great knowledge of the City's existing meter population, including box condition, lid capability, and additional assets for fixed base implementation.

Deliverables | Projected impact of potential meter change-out program associated with the recommended meter retrofit strategy. All applicable information will be summarized in various graphics and tables for presentation and discussion at Workshop No. 1 (**Task 3.3**) as described below.

Task 3 – AMI Systems Analysis

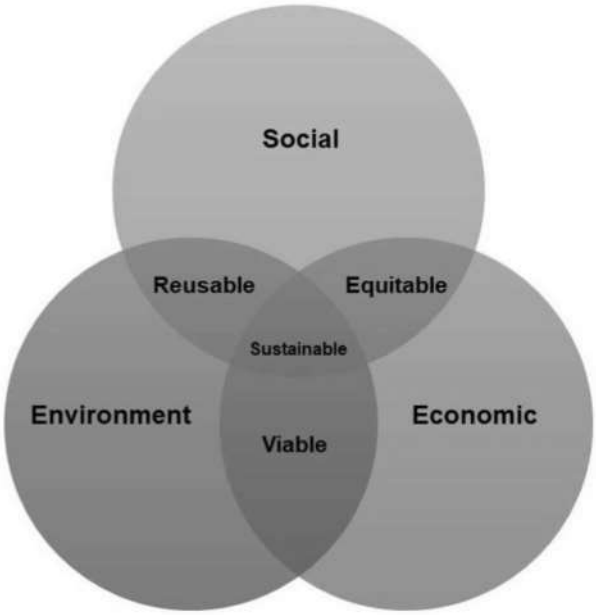
Task 3.1 – Technology Review

In addition to assessing the full-scale deployment of Neptune AMI using the existing R900 radios our analysis will investigate other leading AMI technologies while providing staff with updated summaries of available equipment and retrofit options. Drive-by (AMR) reading and cellular will be contrasted with a dedicated private AMI network to fully evaluate the benefits of deploying collectors to facilitate full AMI. For vendors offering both an AMR and AMI solution, hybrid options can be evaluated.

Deliverables | A survey of the AMR/AMI technology landscape including a brief overview of current technologies most suited to the City. A summary of network topology, retrofit needs, and anticipated pros and cons of each major supplier's equipment as it relates the City's system will be prepared. A comparison of existing AMR and AMI will be presented along with staff preferences which will be summarized in the final Workshop No.2 presentation.

Task 3 – AMI Systems Analysis (cont.)

Task 3.2 – Social and Environmental Benefits Analysis



GHD typically identifies non-monetary benefits of an AMI or AMR system based on the "Triple Bottom Line Assessment." The Venn Diagram in the figure at left reflects the inter-relationship of social, environmental, and economic considerations while emphasizing the synergy of these factors as they intersect and complement each other.

Under this task, we will present staff with worksheets designed to spur discussion and identify non-monetary benefits of the proposed project.

Items will include both tangible and non-tangible considerations such as increased customer engagement and satisfaction, use of AMI data for subsequent engineering analysis, increased data integrity, improved leak response and awareness, and budgeting and forecasting enhancements through improved data acquisition and meter data management.

Deliverables | Completed forms that present and discuss non-monetary, social and environmental benefits applicable to the City. The information from the completed tables will be used in the final report and presentations along with the hard business case metrics.

Task 3.3 – Technology Workshop (Workshop 1)

An initial workshop will be conducted with key stakeholders from the customer service department, operations team, IT staff, and others as deemed appropriate based on the agreed upon approach in the initial kick-off meeting. The purpose of the meeting will be to review all data that has been collected and processed by the GHD team from prior tasks and discuss available alternatives and preferences.

Deliverables | Initial findings from previous tasks including updated maps of current assets, system-wide meter accuracy projections, technology options, and anticipated non-monetary benefits. Meeting minutes will be prepared documenting agreed upon metrics to be used in the final business case analysis.

Task 4 – Business Case Analysis

Task 4.1 – Enterprise-Wide Impacts Analysis

This task will involve preparing a summary for the final report which presents the anticipated impacts of information from **Task 3** in the final report. Related report sections will include a summary of all identified tangible and intangible benefits listed in the RFP. Estimates will be developed from the completed questionnaires from the proposed Workshop No. 2 (**Task 4.3**) discussed below.

Task 4 – Business Case Analysis (cont.)

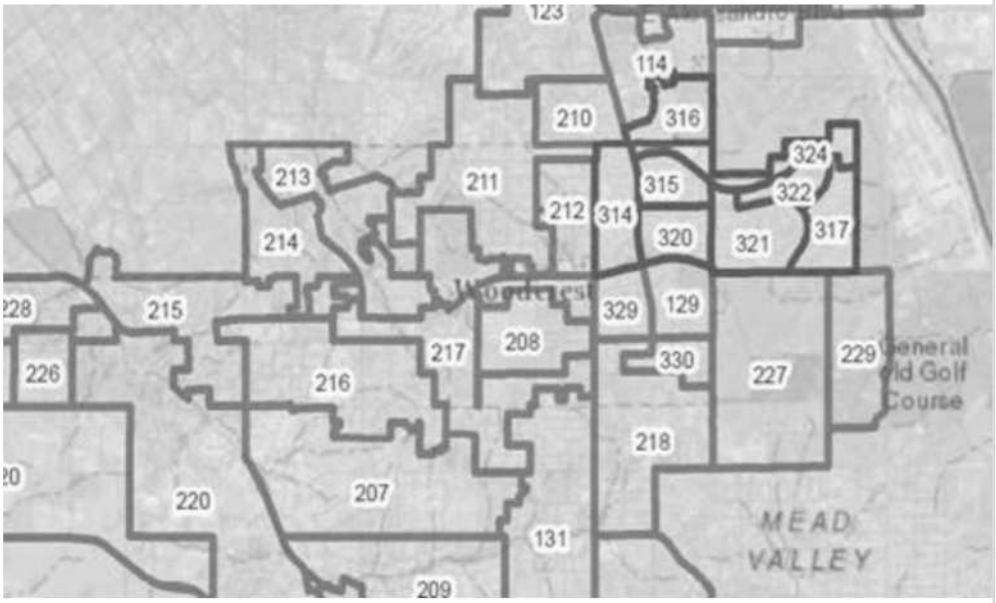
Deliverables | Draft and final sections in feasibility report incorporating the tangible and intangible benefits developed throughout the study along with anticipated impacts on the organizations business processes, staffing, and technology requirements.

Task 4.2 – Develop Phasing Strategy

Under this task we will rely on our understanding of the spatial distribution of meters, accuracy, retrofit needs, proposed technology, and available funding to prepare an optimal plan for either full scale deployment or a phased implementation strategy. A major challenge will include the recommended procurement strategy for both equipment and installation with consideration of bidding requirements, City ordinances, and staffing capabilities.

Deliverables | Narrative, cost breakdowns, and GIS based maps of a preliminary implementation strategy will be presented in a workshop presentation, draft, and final report. Critical items for a subsequent RFP will also be identified, discussed, and presented in the report.

Related Anecdotal Project Description



The figure at right presents AMI implementation zones within the California Western Municipal Water District (WMWD).

The goal of the WMWD AMI Phase I Project was to deploy fixed base reading capabilities in an area deemed most appropriate and AMR in other areas based on existing assets, terrain, and other factors that were determined in the planning phase.

If selected, GHD will consider utilization of a similar approach in comparison to full-scale implementation based on available funding and the report findings.

Task 4.3 – Workshop No. 2 (Operational Impacts)

This second workshop will include considerations of financing, phasing, risks, and operational impacts. All material developed to date will be presented prior to completing the draft report.

Deliverables | Completed questionnaires, financing options, risk areas, and operational impacts will be presented and discussed openly prior to compiling all relevant information into the final project report. Meeting minutes will be prepared summarizing staff direction and preferences.

Task 5 – Feasibility Analysis

Task 5.1 – Cost/Benefit Analysis

This task will involve preparing a summary for the final report that presents the anticipated impacts of information from Task 4 in the final report. Related report sections will include a summary of all identified tangible and intangible benefits. Estimates will be developed from the completed questionnaires that will be refined after Workshop No. 2.

Deliverables | Draft and final sections in feasibility report incorporating the monetary (tangible) and non-monetary (intangible) benefits developed throughout the study along with anticipated impacts on the organization's business processes, staffing, and technology requirements.

Task 6 – Business Process Analysis

Task 6.1 – Staffing Evaluation

This task will include performing a business process analysis which includes current state and recommendations for future processes, practices, and staffing changes/job description updates for AMI implementation. Areas to be identified will include impacts to customer service staff, meter reading staff, technicians, and operations as well as future re-allocations of effort due to changes in meter reading systems and technology.

Deliverables | Summary of future implications and impacts of AMI as it relates to staffing requirements

Task 7 – Implementation Strategy

Task 7.1 – Develop Implementation Strategy

Under this task we will rely on our understanding of the spatial distribution of meters, accuracy, retrofit needs, proposed technology, and available funding to prepare recommended strategies for either full-scale deployment or a phased implementation. A major challenge will include the recommended procurement strategy for both equipment and installation with consideration of bidding requirements, City ordinances, and staffing capabilities.

Deliverables | Narrative, cost breakdowns, and GIS based maps of a preliminary implementation strategy will be presented in a workshop presentation, draft, and final report. Critical items for a subsequent RFP will also be identified, discussed, and presented in the report.

Task 8 – Prepare AMI System Assessment Report
Task 8.1 – Prepare Project Report (Draft)
A draft report, incorporating all items discussed above, will be prepared for review by staff prior to completion.
Deliverables | Electronic submission of draft report in PDF format and up to three (3) hardcopies if requested.
Task 8.2 – Review Meeting
The GHD Team will meet with City staff in person or via webinar to review the draft report and related staff input prior to preparing the final report.
Deliverables | Meeting minutes and summary of proposed changes to draft report.
Task 8.3 – Finalize Report
A final report will be prepared incorporating all staff comments and submitted upon completion.
Deliverables | Electronic submission of final report and business case in PDF format and up to three (3) hardcopies if requested. More hard copies can be prepared at cost if requested by the City.
Task 8.4 – Final Oral Presentation
A PowerPoint presentation (PPT) and review of key findings can be made publicly, if requested by the City, under this task.
Deliverables | PPT presentation and related handouts summarizing key findings and business case results.

1.2 Steps to City's AMI Implementation

A successful meter replacement/retrofit project for the City of Peoria must first be based on a thorough understanding of existing assets, service areas, staff needs, preferences, and financing options. Support from all departments should be garnered and a team should be formed that can work together toward successful implementation. Once this support is achieved, the challenge of completing the effort as efficiently as possible – with minimal impacts to existing staff, operations, and customers – must be considered. The availability of GIS data, meter test data, and other important information will help streamline installation while providing value-added information for the project and future operational functions and needs. The steps associated with implementing a meter retrofit/replacement project are outlined in the figure below.

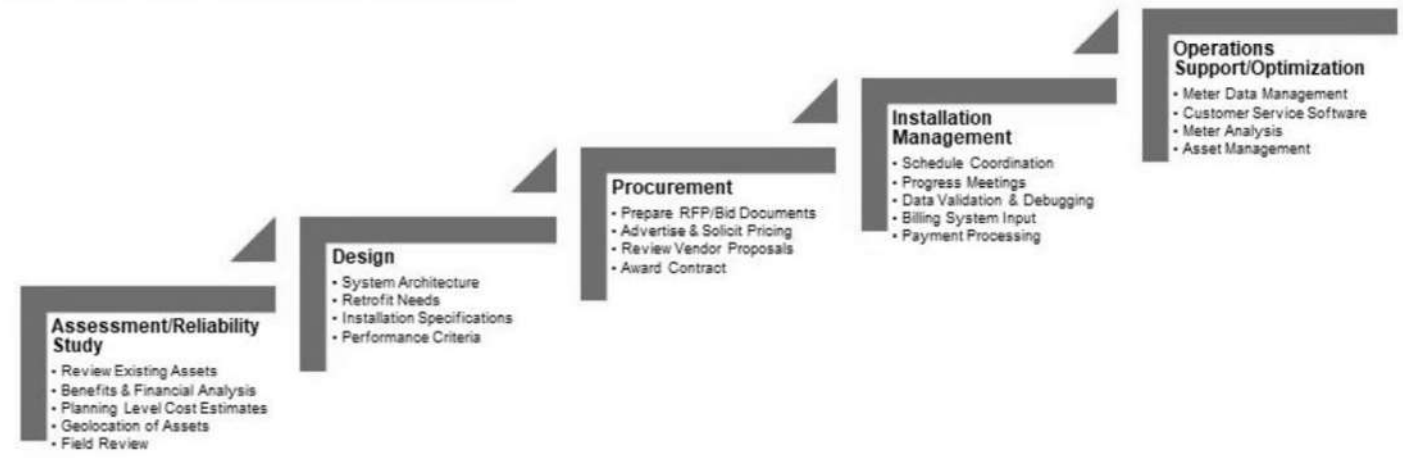


Figure 1: AMI Implementation Steps

Figure 2: Spatial Distribution of Meters

Figure 3: Results of Field Survey Showing Meter Type, Box Condition, and Lid Type

1.3 Risk Ratings and Rankings

Naming a generic technology category without referencing the source of this technology may introduce a risk in rating and ranking processes. Such an approach may give the impression that the innovative attributes can include those protected by intellectual property provisions and are the same for all products categorized by that technology. This is specifically relevant to smart (AMI/AMR) meters and their communication backbones. Extreme caution is required when considering the risks and benefits associated with these generic technology categories especially when mixing and matching those from different manufacturers. For example, the benefits of one manufacturer's product will not necessarily be achieved by another manufacturer's product within the same category.

GHD's methodology involves a detailed assessment of risks and benefits associated with the various technologies and with respect to the City's ultimate objectives for implementing smart (AMI/AMR) metering. This detailed assessment will be summarized for the technology rating according to whether they are an advantage, disadvantage or neutral in terms of these objectives.

The categories and sub-categories for the various technologies will be rated according to the level of risk in terms of the projects' objectives and specific technological considerations as follows:

- **Categories** include the following selected examples:
  - Intelligent meters
  - Communications backbone
  - Meter Data Management Systems
- **Subcategories** include the following selected examples:
  - Solid state digital meters
  - Mechanical meters
  - Long-range radios
  - Short-range radios
  - Narrow Band Internet of Things (NBIoT)
  - Long Range and Low Power Wide Area Network (LoraWAN)

    - HSE (Head End Software) (manages the data and transmissions to and from the remote meters)
- **Considerations** per technological descriptor include these selected examples:
    - Meter operating range
    - Mechanical wear and tear
    - Integrated logger transmitter
    - Add-on logger/transmitter
    - Digital storage capacity
- **Ratings** for all these items will be in terms of the following summary: Advantage, Disadvantage and Neutral.

Assessment of these overall risks will facilitate identification of the three (3) technologies that will progress to more detailed financial analysis.

City of Peoria Involvement

GHD typically works collectively with the City during a feasibility study. It is critical that all levels of City staff be involved in all aspects of the study, from knowing locations of the existing meter population to understanding the layout of the City, the desires of the customers, and how the project will impact the City as a whole. GHD will engage the City in helping to understand the existing meter population by having the meter readers fill out a prepopulated form as they are reading the meters. This form can include things such as meter location, meter box and lid condition, and any additional information that is deemed important.

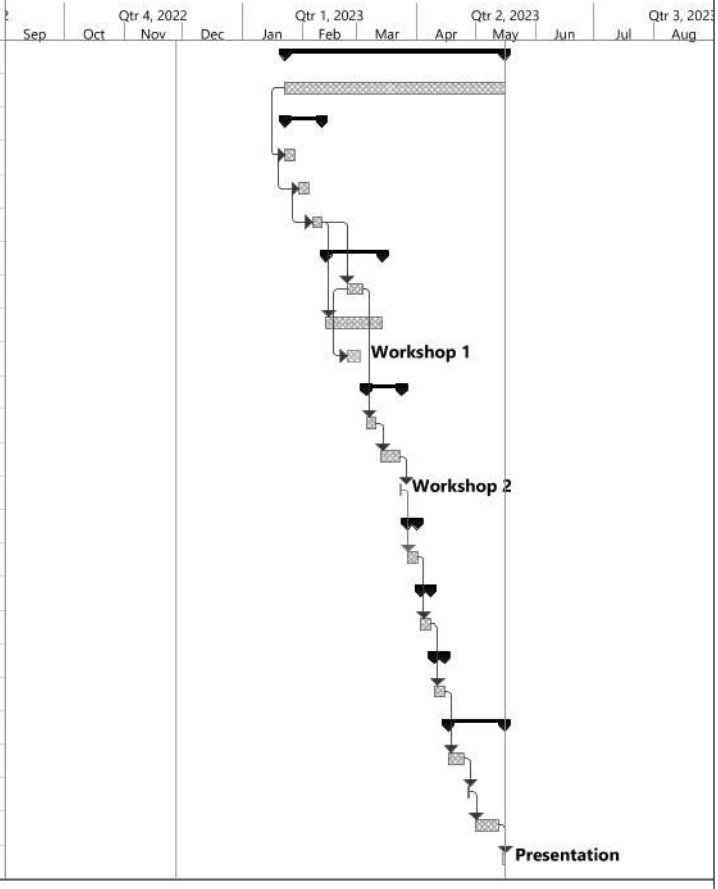
GHD will also meet with each vital department during the feasibility study to support the Triple Bottom Line task (**Task 3.2**) of our proposal. This will help us understand how the City departments are currently managing the meter program and gain insight into how the AMI program will move forward, including what staff may be reassigned because of the new meter reading technology and how that might benefit the City moving forward.

Project Schedule

We have provided the Project Schedule on the following page.

Consulting Services for AMI
Peoria, AZ
Project Schedule

ID	Task Name	Start	Finish
1	**Task 1 - Project Management**	**Mon 1/23/23**	**Mon 5/15/23**
2	Task 1.1 - Project Kickoff and Mobilization	Mon 1/23/23	Mon 5/15/23
3	**Task 2 - Review of Existing Infrastructure and Processes**	**Mon 1/23/23**	**Fri 2/10/23**
4	Task 2.1 - Project Kickoff Meeting	Mon 1/23/23	Fri 1/27/23
5	Task 2.2 - Existing Systems and Process Review	Mon 1/30/23	Fri 2/3/23
6	Task 2.3 - Existing Meter and Asset Evaluation	Mon 2/6/23	Fri 2/10/23
7	**Task 3 - AMI System Analysis**	**Mon 2/13/23**	**Mon 3/13/23**
8	Task 3.1 - Technology Review	Fri 2/24/23	Fri 3/3/23
9	Task 3.2 - Social and Environmental Benefits Analysis	Mon 2/13/23	Mon 3/13/23
10	Task 3.3 - Technology Workshop	Fri 2/24/23	Thu 3/2/23
11	**Task 4 - Business Case Analysis**	**Mon 3/6/23**	**Thu 3/23/23**
12	Task 4.1 - Enterprise Wide Impacts Analysis	Mon 3/6/23	Fri 3/10/23
13	Task 4.2 - Develop Phasing Strategy	Mon 3/13/23	Wed 3/22/23
14	Task 4.3 - Operational Impacts Workshop	Thu 3/23/23	Thu 3/23/23
15	**Task 5 - Feasibility Analysis**	**Mon 3/27/23**	**Fri 3/31/23**
16	Task 5.1 - Cost/Benefit Analysis	Mon 3/27/23	Fri 3/31/23
17	**Task 6 - Business Process Analysis**	**Mon 4/3/23**	**Fri 4/7/23**
18	Task 6.1 - Staffing Evaluation	Mon 4/3/23	Fri 4/7/23
19	**Task 7 - Implementation Strategy**	**Mon 4/10/23**	**Fri 4/14/23**
20	Task 7.1 - Develop Implementation Strategy	Mon 4/10/23	Fri 4/14/23
21	**Task 8 - Prepare AMI System Assessment Report**	**Mon 4/17/23**	**Mon 5/15/23**
22	Task 8.1 - Prepare Project Report	Mon 4/17/23	Mon 4/24/23
23	Task 8.2 - Review Meeting	Thu 4/27/23	Thu 4/27/23
24	Task 8.3 - Finalize Report	Mon 5/1/23	Fri 5/12/23
25	Task 8.4 - Final Presentation	Mon 5/15/23	Mon 5/15/23



2. Staff Capabilities and Assignments

GHD operates under a “One GHD” approach; we will pull resources as needed to bolster project teams for the benefit of our clients. In the West, GHD maintains 16 offices, which allows us to draw upon a deep well of resources to respond quickly to any project challenge. Our strong record of repeat business demonstrates our success in being responsive to our clients’ needs.

»GHD has more than 75 staff in Arizona with experience in water planning, design, and operations throughout the state.«

Our organizational chart below identifies each team member and advises their primary role.

2.1 Key Team Members

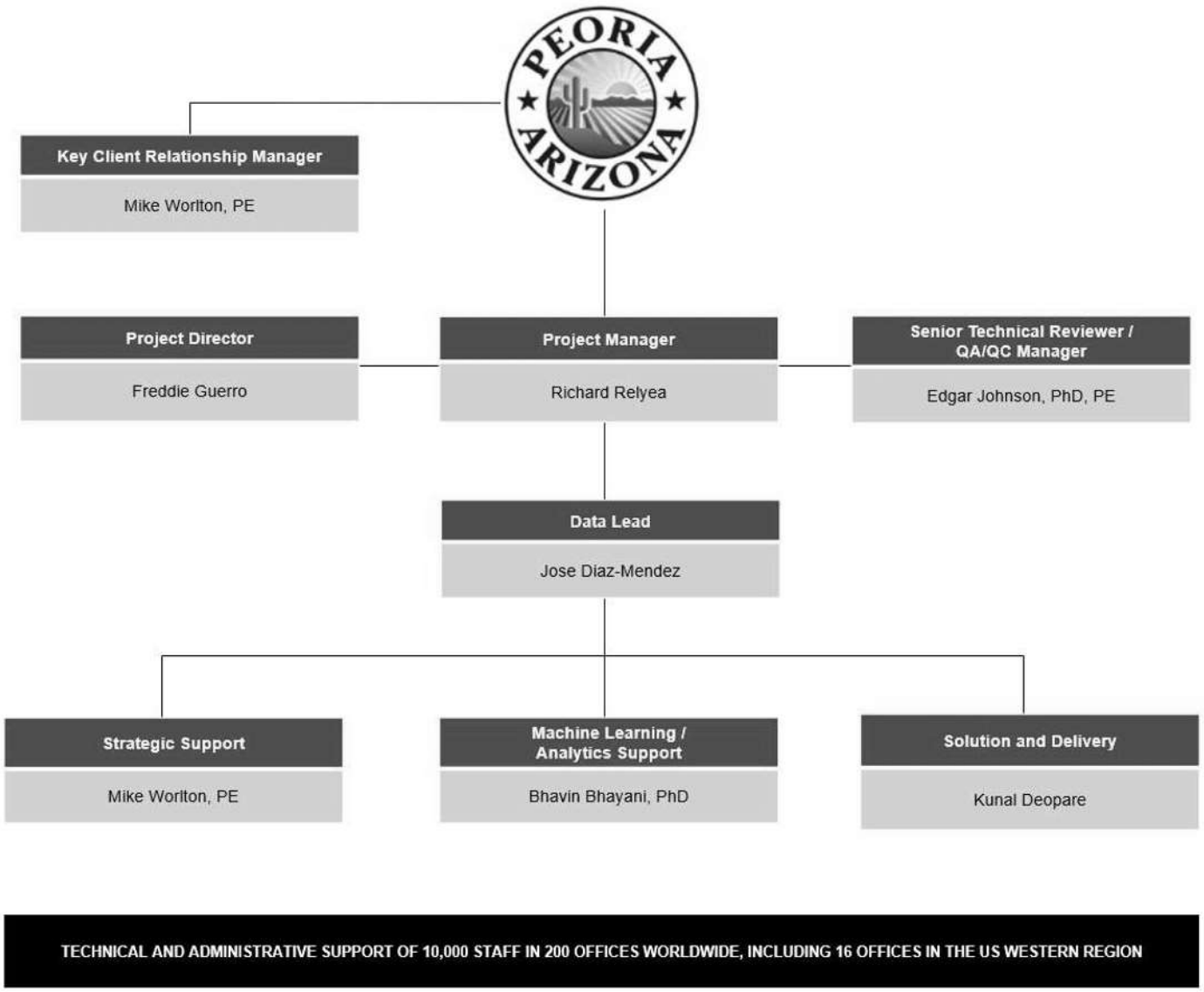


Figure 3 Organizational Chart – Key Team Members

2.2 Experience and Capabilities

Everyone on our team was carefully selected based on their unique expertise and experience in achieving success on similar projects and their commitment to continuing to provide a lasting benefit to the City of Peoria.

GHD offers the City a team that can use their extensive experience to provide services specifically tailored to meet this community's needs.

Freddie Guerra
Project Director

Qualifications/Accreditations | MS, Environmental Science, Baylor University, Waco, TX, 1992; BS, Biology & Chemistry, Baylor University, Waco, TX, 1990; Member, National Association of Clean Water Agencies; Member, Water Environment Federation

Experience | Freddie currently serves as GHD's Digital North America Water Market Leader and has 30 years of experience and understands innovation is the key to taking on water's biggest challenges. His focus has been assisting the public sector to connect deep human and data insights with the possibilities of technology to define and deliver new realities, with enhanced experiences that can improve lives and deliver extraordinary mission outcomes. Building on a long legacy of innovation, he has collaborated with clients in accelerating their digital transformation by bringing agile processes, human-centered design, digital platforms, and smart analytics to create better customer experiences and drive improved performance.

Richard Relyea
Project Manager

Qualifications/Accreditations | BS, Mechanical Engineering, California State University, Fresno, CA, 2004; AS, Liberal Studies, Ventura College, Ventura, CA, 2000; Certified Water Audit Validator, 2018 – Present; Water Quality Manager, Air Force Institute of Technology, 2010

Experience | Richard Relyea as over 18 years of experience as a mechanical engineer serving water clients in Northern California and the Western US. He has been involved in managing the financing for large municipal water meter/AMI implementation projects and has an intimate understanding of the relationship between water rates and the basis of the customer meter related charges. His skills have tracked the evolution of meter and AMI technologies and sits on the board of the AWWA meter committee and is also a member of the Water Loss TAP committee that developed the AWWA Water Audit Validation Criteria. He understands how to work with agencies to help channel the abilities of diverse team members and stakeholders to achieve common goals.

Richard has presented on currently available options for AMI systems at the AWWA Integrated Water Conference and has presented on numerous other occasions on energy management, water meters, and cloud-based technologies for AWWA and others. Richard's extensive first-hand experience with several different AMI offerings has uniquely prepared him to serve as a dedicated Project Manager for this project.

Jose Diaz-Mendez
Data Lead

Qualifications/Accreditations | BS, Civil Engineering, California State University, Sacramento, CA, 2016

Experience | Jose Antonio Diaz-Mendez has 8 years of experience working as a civil engineer on water, wastewater, and water efficiency engineering projects while serving multiple clients in California. His background has involved serving as a project manager, project engineer, and a construction project superintendent for water meter changeout /AMI implementation projects, and civil inspector for potable distribution infrastructure installation and sanitary sewer lining CIPP/dig and replace projects. He has developed unique skills specific to water infrastructure projects that include construction management, AMR/AMI data management, GIS mapping, asset management development, water loss control, and the acquisition of project funding.

Bhavin Bhayani, PhD
Machine Learning / Analytics Support

Qualifications/Accreditations | PhD, Bioprocess Engineering, State University of New York College of Environmental Science and Forestry, Syracuse, NY, 2013; MS, Civil Engineering, State University of New York College of Environmental Science and Forestry, Syracuse, NY, 2007; BS, Environmental Engineering, Shivaj University, Kolhapur, India, 2005; Air & Waste Management Association, Central New York Chapter; Green Belt Six Sigma, State University of New York College of Environmental Science and Forestry, 2010

Experience | Experience | Bhavin has over 10 years of diverse experience managing and designing projects including municipal and industrial projects (water/wastewater, production, processing, etc.), and renewable energy projects (feasibility studies, methane fueled cogeneration, biochemicals etc.). Bhavin also has specialized experience managing, designing, and implementing facility operations and compliance systems for various environments including municipalities, institution, and industrial applications.

Bhavin's experience includes the use of Data Analysis for Process Optimization, Strategic Energy Management initiatives and Life Cycle Analysis.

Kunal Deopare
Solution and Delivery

Qualifications/Accreditations | Bachelor of Commerce, 1997; Laureatus (Doctorate) in Technology, 1987; Master's Diploma in Technology (Water and Wastewater Engineering), 1984; Diploma in Civil Engineering, 1977; Member, AWWA

Experience | Kunal is a Digital Solution Leader at GHD, leading the buildout of Industrial Internet of Things solutions for Water. He has 8 years of technical and managerial experience leading small and large agile software engineering teams, launching new products, and successfully building and executing product roadmaps through their entire lifecycle within the Water industry. He uses his strong foundations in business, finance, operations, and IT to build lasting partnerships across various functions.

Edgar Johnson, PHD, CPEng
Senior Technical Reviewer / QA/QC Manager

Qualifications/Accreditations | Bachelor of Commerce, 1997; Laureates (Doctorate) in Technology, 1987; Master's Diploma in Technology (Water and Wastewater Engineering), 1984; Diploma in Civil Engineering, 1977; Chartered Professional Engineer (CPEng), NER, Member, Engineers Australia; Member, International Water Association (IWA)

Experience | Eggar has more than 35 years' international experience in water management and water/wastewater engineering. His advanced education in water engineering, his commerce degree as well as his specialized knowledge in water managing and engineering is demonstrated through the publication of more than 30 articles/ papers / research books related to this field. As an internationally recognized specialist in water efficiency, demand management, meters, and metering systems, he has successfully developed advanced plans for complex water issues and implemented sophisticated strategies that improved revenue and reduced costs for clients. Involvement with the International Water Association (IWA) Water Loss Specialist Group included leadership of its non-revenue water apparent loss (AL) initiative.

2.3 Subconsultants

GHD is a full-service technology firm and will not require the use of subcontractors.

2.4 Office Location

GHD will perform the work for the City of Peoria from our Phoenix office:

4747 N. 22nd Street
Suite 200
Phoenix, Arizona 85016

3. GHD Experience & Similar Projects

In this section we've highlighted three (3) GHD projects similar in nature to the City's Scope of Work, followed by relevant experience of our Project Manager and proposed team (including a table detailing our overall experience).

3.1 Similar Projects

5-year Water Meter Replacement Program – Australian Capital Territory (ACT) | Icon Water, Canberra | 2018–2021/2022 | $300,000

Summary of Work | Substantial financial impacts to Icon Water – and by extension its customers – prompted this multi-phased project to assess, analyze options for, and develop a five-year replacement strategy for the utility's complete fleet of 123,000 meters.

Initially, to determine the most applicable metering technology for this program, GHD assisted Icon in identifying risks for each option, as well confirming how smart metering could be fully cost recoverable with an increase in water tariffs. Based on our in-depth understanding of various digital metering solutions (as well as our awareness of the untested risk inherent in more immature metering technologies), we analyzed life cycle costs of the small smart meters, finding them to be equal or greater than that of Icon's existing mechanical meter replacement strategy. This meant implementation of smart water metering would require changes to the utility's metering standards, codes, and customer services.

As part of this assessment and review phase, GHD determined Icon's position on both Automated Meter Reading (AMR) and Automated Metering Infrastructure (AMI) smart metering systems, providing an analysis of intelligent network technology options such as smart sensors, communications, systems integration, firmware, software, and network tools. We specified requirements, developed appropriate standards, considered integration with enterprise systems, provided assessment criteria for trials, and then laid out how to provide project management and support for the utility during implementation and integration phases. With Icon, we determined a plan to replace approximately 7,800 meters per year between 2017 and 18, and currently from 2021 to 2022, all considering aspects related to a transition from mechanical to smart metering. The first phase of the five-year strategy, smart metering pilot and full roll-out, is planned for the next regulatory period (i.e., from July 1, 2023) as a continuation of the existing mechanical meter replacement strategy.

Project team members involved | Edgar Johnson (Technical Lead)

Completed On Time and Within Budget

Intelligent/Smart Water Metering Systems | Victoria, Australia

Goulburn Valley Water | 2019–2020 | Construction Cost/Consultants Fee $0.10M

Summary of Work | GHD prepared final, bid-ready plans, specifications, and estimates (PS&E) for the installation of approximately 11,000 smart water meters (new AMR/AMI system) in the Goulburn Valley Water Region. Initially, the GHD team provided full analysis of a field survey of a representative sample of existing metered connections, as well as an examination of findings pertinent for the implementation phase of the smart meter system (e.g., environmental factors, roll outs needed) and an advanced meter analysis regarding technology selection and risk-based assessment.

We assessed technologies within the framework of a Data Acquisition Cycle. We then identified critical technical considerations associated with these technologies, estimated their lifecycle costs, and confirmed with financial modelling of potential solutions.

Following submission of full bid documents, GHD assisted in the bid process/contractor selection.

Project team members involved | Edgar Johnson (Technical Lead)

Completed On Time and Within Budget

Holistic Metering Contract | Queensland, Australia

City of Gold Coast | 2021 –2022 | $.15 million

Since 2017, as part of a Smart Metering as a Service (MaaS) arrangement with a prime contractor and the City of Gold Coast—the second most populous area on the Eastern Australian coast—GHD has provided as-needed professional services related to the development and implementation of asset management programs for the City's 165,000 meters and related assets. This work typically comprises provisions of investigations, studies, specifications (e.g., metering options and optimization studies, pilot trial coordination, smart metering), and development of meter-related strategies and plans through contractor selection and close-out.

We have served the City with:

- Guiding replacement decisions regarding larger water meters
- Assessing requirements for in-line flow meters on existing and future fire services
- Advising on recycled water meter specifications according to both regional standards and international state-of-the-practice
- Providing large water meter verification and specifications review
- Undertaking an initial investigation into implementing a smart water metering solution based on the Smart City LoRaWAN® platform

Project team members involved | Edgar Johnson (Technical Lead)

Completed On Time and Within Budget

Additional Team Member Experience

Summary of Work | As the first step in investigating the potential for installing new AMI technology concurrently with planned meter replacements, GHD worked with the Western Municipal Water District (WMWD) to evaluate the accuracy of the existing water meters and to develop a testing program to identify revenue increases associated with replacing residential 15 years and older. Subsequently, we conducted an additional field survey and testing program to encompass over 780 intermediate-to-large meters to identify additional potential revenue recovery. Our team's goal was to find areas for potential revenue increase based on inaccurate meters – combined with anticipated labor savings for the conversion of drive-by and manual-read meters to AMI – to craft a more equitable billing structure, thereby funding further needed meter replacements and AMI installation. Following the initial meter accuracy study and testing program, GHD performed an AMI feasibility study to evaluate alternatives for implementing a meter changeout/retrofit program for approximately 20,000 residential meters. We analyzed multiple AMI system scenarios with input from meter/AMI vendors, as well as GIS mapping and existing assets and terrain, to determine cost-effective first-phase AMI and AMR meter reading capabilities, all with the goal of guiding the WMWD to selecting the most viable meter and AMI technology. Final recommendations for WMWD comprised an AMI pilot program, which led to a District-wide meter replacement project, along with an AMI system using new Neptune LoRa-based meter reading technology. GHD acted as an extension of the WMWD to manage the installation and the implementation of AMI, including resolving issues with installation, data validation, integrating the installation data from the vendor into the WMWD's CMMS system, and conflict resolution during the project. WMWD has since applied for additional funding, and recently completed the meter changeout/AMI implementation program.

Project team members involved | Richard Relyea (Project Manager), Jose Diaz-Mendez (Project Engineer)

SAN BRUNO
— California —

Meter Replacement & AMI Implementation Project

City of San Bruno, CA | $160,000

Summary of Work | As the first step in investigating the potential for installing new AMI technology concurrently with planned meter replacements, GHD worked with the Western Municipal Water District (WMWD) to evaluate the accuracy of the existing water meters and to develop a testing program to identify revenue increases associated with replacing residential 15 years and older. Subsequently, we conducted an additional field survey and testing program to encompass over 780 intermediate-to-large meters to identify additional potential revenue recovery. Our team's goal was to find areas for potential revenue increase based on inaccurate meters – combined with anticipated labor savings for the conversion of drive-by and manual-read meters to AMI – to craft a more equitable billing structure, thereby funding further needed meter replacements and AMI installation. Following the initial meter accuracy study and testing program, GHD performed an AMI feasibility study to evaluate alternatives for implementing a meter changeout/retrofit program for approximately 20,000 residential meters. We analyzed multiple AMI system scenarios with input from meter/AMI vendors, as well as GIS mapping and existing assets and terrain, to determine cost-effective first-phase AMI and AMR meter reading capabilities, all with the goal of guiding the WMWD to selecting the most viable meter and AMI technology. Final recommendations for WMWD comprised an AMI pilot program, which led to a District-wide meter replacement project, along with an AMI system using new Neptune LoRa-based meter reading technology. GHD acted as an extension of the WMWD to manage the installation and the implementation of AMI, including resolving issues with installation, data validation, integrating the installation data from the vendor into the WMWD's CMMS system, and conflict resolution during the project. WMWD has since applied for additional funding, and recently completed the meter changeout/AMI implementation program.

Project team members involved | Richard Relyea (Project Manager), Jose Diaz-Mendez (Project Engineer)

Table 1: Additional Team Member Experience

Project Name	Client & Location	Number of Connections	Fee Cost of Project	Technology Assessment	Feasibility & Business Case	Right Size, Right Type	Procurement Assistance	Deployment Management	Asset Inventory
Meter Changeout/AMI Implementation Feasibility and Implementation Project	Western Municipal Water District, Riverside, CA	23,000	$600K	✓	✓	✓	✓	✓	✓
Meter Changeout/AMI Implementation Feasibility and Implementation Project	City of San Bruno, CA	10,500	$160K		✓	✓	✓	✓	✓
USDA Funded Infrastructure Project w/AMR and Meter Replacement Implementation	Clearlake Oaks County Water District, CA	2,000	$550K	✓	✓	✓	✓	✓	✓
Water Loss and Meter Changeout/AMI Implementation Management	Town of Hillsborough, CA	4,000	$120K		✓	✓	✓	✓	
AMI Feasibility Study and Procurement Assistance	Georgetown Divide Public Utility District, CA	4,000	$69K	✓	✓	✓	✓		✓
USDA Funded Infrastructure Project and Meter Replacement/AMR Implementation	Blue Lake Springs Mutual Water Company, Arnold, CA	2,400	$1.2M	✓	✓	✓	✓	✓	✓
SLAC National Accelerator Laboratory Water Audit and Leak Survey	Stanford Linear Accelerator Laboratory, Palo Alto, CA	60	$50K		✓	✓			✓
Meter Changeout/AMI Implementation Feasibility and Implementation Project	Dublin San Ramon District, CA	8,000	$400K		✓	✓	✓	✓	
Water Meter Replacement Cost Benefit Analysis and Testing Program	City of Rio Vista, CA	2,050	$140K		✓	✓	✓		✓
AMI Feasibility Analysis	El Toro Water District, Lake Forrest CA	13,200	$150K	✓	✓	✓	✓		
Meter Evaluation and Water Loss Management System	California State University, East Bay	800	$110K		✓	✓	✓		
Small Main and Meter Retrofit Project	California American Water, CA	40,000	$42K	✓		✓	✓	✓	
AMI/AMR Feasibility Study	Elk Grove Water District	12,000	$30K	✓	✓	✓	✓		✓

3.2 Project References

Project Owner	City of Patterson, California
Contact Information	Marie Peterson Utility Billing & Revenue Manager 209 895-8047 Direct mpeterson@ci.patterson.ca.us
Project Type	Meter Installation and AMI Implementation
Project Value	$100,000 USD
Dates	October 2022 to (anticipated) December 2023

Project Owner	Icon Water, Canberra (ACT), Australia
Contact Information	Guy Price Manager Asset Information, Metering and Revenue Assurance 61.406.376.714 Guy.Price@iconwater.com.au
Project Type	Consultancy Services
Project Value	$300K AUD
Dates	2018 to 2021/2022

Project Owner	City of Gold Coast, Australia
Contact Information	Shane Mitchell 61 488.406.160
Project Type	As-Needed Technical Services
Project Value	$0.15M Construction Cost/Consultants Fee AUD
Dates	2021 to 2022

4. Cost Considerations

GHD has provided the Fee Schedule on the following page.

5. Conformance to RFP

GHD does not have any exceptions to any part of the RFP.

GHD

Peoria Consulting Services for AMI

Description		Project Director	Project Manager	Key Client Relationship /Strategic Support	Seniror Technic al Reviewer-QA/QC	Data Lead	Machine Learning/An alytics Support	Solution and Delivery	Admin	Total Hours	Labor Total	Travel	Total Disb.	Estimated Project Total
		Freddie Guerra	*Richard Relyea*	*Mike Worlton*	*Edgar Johnson*	*Jose Diaz*	*Bhavin Bhayani*	*Kunal Deopare*	*TBD*					
		$283.0	$237.0	$340.0	$185.0	$195.0	$283.0	$315.0	$158.0					
Task1		***4***	***24***	***0***	***0***	***0***	***0***	***0***	***8***	***36***	***$8,084***	***$0***	***$0***	***$8,084***
Subtask 1.1	Project Management (PM)	4	24	0	0	0	0	0	8	36	$8,084	$0	$0	$8,084
Task2		***8***	***32***	***8***	***16***	***48***	***8***	***0***	***0***	***120***	***$27,152***	***$3,000***	***$3,000***	***$30,152***
Subtask 2.1	Project Kick-Off Meeting	4	8	4	0	8	0	0	0	24	$5,948	$1,000	$1,000	$6,948
Subtask 2.2	Existing Systems and Process Review	0	0	0	8	16	4	0	0	28	$5,732	$0	$0	$5,732
Subtask 2.3	Existing Meter Asset Evaluation	4	24	4	8	24	4	0	0	68	$15,472	$2,000	$2,000	$17,472
Task3		***12***	***20***	***8***	***12***	***16***	***0***	***0***	***0***	***68***	***$16,196***	***$1,000***	***$1,000***	***$17,196***
Subtask 3.1	Technology Review	4	8	0	8	8	0	0	0	28	$6,068	$0	$0	$6,068
Subtask 3.2	Social and Environmental Benefits Analysis	4	8	8	4	8	0	0	0	32	$8,048	$0	$0	$8,048
Subtask 3.3	Technology Workshop (Workshop 1)	4	4	0	0	0	0	0	0	8	$2,080	$1,000	$1,000	$3,080
Task4		***2***	***24***	***4***	***8***	***16***	***4***	***4***	***0***	***62***	***$14,606***	***$1,000***	***$1,000***	***$15,606***
Subtask 4.1	Enterprise-Wide Impacts Analysis	0	8	0	4	0	0	0	0	12	$2,636	$0	$0	$2,636
Subtask 4.2	Develop Phasing Strategy	0	8	4	4	8	4	4	0	32	$7,948	$0	$0	$7,948
Subtask 4.3	Workshop No. 2 (Operational Impacts)	2	8	0	0	8	0	0	0	18	$4,022	$1,000	$1,000	$5,022
Task5	***Bid Documents & Servivices***	***0***	***8***	***0***	***4***	***8***	***0***	***0***	***0***	***20***	***$4,196***	***$0***	***$0***	***$4,196***
Subtask 5.1	Cost Benefit/Analysis	0	8	0	4	8	0	0	0	20	$4,196	$0	$0	$4,196
Task6	***Construction Engineering Services***	***2***	***8***	***0***	***0***	***0***	***0***	***4***	***0***	***14***	***$3,722***	***$0***	***$0***	***$3,722***
Subtask 6.1	Staffing Evaluation	2	8	0	0	0	0	4	0	14	$3,722	$0	$0	$3,722
Task7	***Permitting (Provisional)***	***2***	***8***	***0***	***0***	***0***	***4***	***4***	***0***	***18***	***$4,854***	***$0***	***$0***	***$4,854***
Subtask 7.1	Develop Implementation Strategy	2	8	0	0	0	4	4	0	18	$4,854	$0	$0	$4,854
Task8		***12***	***32***	***4***	***8***	***16***	***4***	***4***	***32***	***112***	***$24,388***	***$1,000***	***$1,000***	***$25,388***
Subtask 8.1	Prepare Project Report (Draft)	0	8	0	4	16	0	0	16	44	$8,284	$0	$0	$8,284
Subtask 8.2	Review Meeting	4	8	0	0	0	0	0	0	12	$3,028	$0	$0	$3,028
Subtask 8.3	Finalize Report	4	8	4	4	0	4	4	16	44	$10,048	$0	$0	$10,048
Subtask 8.4	Final Oral Presentation	4	8	0	0	0	0	0	0	12	$3,028	$1,000	$1,000	$4,028
	Total Labor Hours	***42***	***156***	***24***	***48***	***104***	***20***	***16***	***40***					
	Estimated Project Total	**$11,886**	**$36,972**	**$8,160**	**$8,880**	**$20,280**	**$5,660**	**$5,040**	**$6,320**	**450**	**$103,198**	**$6,000**	**$6,000**	**$109,198**

Appendix A

CVs

Richard Relyea

Project Manager

Location

Auburn, California

Experience

18 years

Qualifications/Accreditations

- BS, Mechanical Engineering, California State University, Fresno, CA, 2004
- AS, Liberal Studies, Ventura College, Ventura, CA, 2000
- Certified Water Audit Validator, 2018 - Present
- Water Quality Manager, Air Force Institute of Technology, 2010

Key technical skills

- Pipeline Design
- Water Loss Analysis
- AutoCAD Civil 3D and Water / Sewer CAD
- ArcGIS Pro and Trimble GPS Software
- Leak Detection / Water Loss Equipment

Memberships

- American Water Works Association (AWWA) Water Loss Committee
- AWWA Water Meter Committee (Board)
- AWWA Small Utility Committee
- AWWA Water Audit Validator Committee

Relevant experience summary

Richard Relyea has over 18 years of experience as a mechanical engineer serving water and wastewater clients in Northern California and the Western US. His unique background has involved serving as a business class leader, designer, project manager, and construction manager for a variety of planning, capital improvement projects, efficiency studies, construction projects and programs, many involving private / public partnerships of planning, capital improvement projects, efficiency studies, construction projects and programs - many involving private / public partnerships. Richard has extensive knowledge of Civil 3D, ArcGIS Pro, Trimble software, and all Microsoft Office software, as well as being an excellent communicator and have extensive water meter and meter technology knowledge.

Study for root causes of losses in Kahramaa's water network

Technical Lead |
Qatar Energy | Doha, Qatar | 2022-2024

Tasks included data gathering, data analysis, site investigation, and reporting & presentations. Analysis includes determining the water balance of a system that includes 430,000 existing water meters, 9 desalinization plants, dozens of DMAs, storage tanks, and existing pipelines.

Water meter installation/AMI implementation project management

Project Manager |
City of Patterson | Patterson, CA | 2022-2023

Project the oversight of the installation of 6,000 water meters and the implementation of a Badger Beacon Cellular AMI system. Tasks include database building, GIS Installation route developments, billing system integration, project management, installation validation, and project closeout.

Water meter installation/AMI implementation project management

Project Manager |
City of Richland Hills | Richland Hills, TX | 2022-2023

Project the oversight of the installation of 3,000 water meters and the implementation of a Badger Beacon Cellular AMI system. Tasks include database building, GIS Installation route developments, billing system integration, project management, installation validation, and project closeout.

USDA funded infrastructure improvement projects

Project Manager, Lead Design Engineer | Clearlake Oaks County Water District | Clearlake Oaks, CA | 2015-2021 | $7 million

Served as Project Manager and Lead Design Engineer for this $7 million United States Department of Agriculture (USDA) funded improvement projects. Project included two new water tanks, the installation of two miles of new distribution mains within the district including all applicable appurtenances, the replacement of over 2,000 water meters, the installation of 800 new cross connection devices, the rehabilitation of the water treatment plant, and a new pump station. Duties also included RD Apply application documentation, the initial Preliminary Engineering Report (PER) to obtain funding, all funding documents through the USDA, Civil 3D design, ArcGIS Pro database creation, and all inspection during the project. Also included were budget allocations, pay requests, change orders, Requests for Information (RFI's) and submittals.

Blue Lake Springs Mutual Water Company water system improvement projects

Project Manager, Lead Design Engineer | Blue Lake Springs Mutual Water Company | Arnold, CA | 2016-2020 | $12 million

Served as Project Manager and Lead Design Engineer. Prepared USDA funding package including PER and all funding documents to help secured $12 million in federal funding. Managed the design and assisted in the oversight of over 12 miles of pipeline replacement including appurtenances, water meters, services, and a new pump station. Developed a full asset management program to be used for assisting the Water Company in properly managing their short-term and long-term water infrastructure investments. Also was instrumental in developing a Geographic Information System (GIS)-based mapping and database system for use during both the construction project and the asset management plan development. Presented at multiple board presentations and townhall meetings, always working with the public during the project.

Tualatin Valley Water District Advanced Metering Infrastructure (AMI) feasibility study

Project Manager | Tualatin Valley Water District | Beaverton, OR

Managed the development a feasibility study to present alternatives for the replacement of over 55,000 water meters and the implementation of an AMI read system. Developed business case, secured funding, ran pilot program and worked as an extension of the District for the installation of Neptune water meters and AMI technology.

AMI feasibility study / intermediate meter testing / meter replacement project

Project Manager | El Toro Water District | Lake Forest, CA

Served as Project Manager for the development of both a feasibility study and alternatives analysis for installing AMI technology and a related meter changeout program for approximately 10,000 metered services. Included in the study was a SCADA integration as well. A separate analysis of the District's two-inch meter population was performed that led to a discovery of a major water loss issue. The results of the project helped develop a business case that the District is using to help finance their upcoming AMI implementation project. Results of the intermediate meter projects are to be presented at the national AWWA conference in Las Vegas, Nevada.

AMI Feasibility Study / meter replacement project / AMI implementation

Project Manager | Western Municipal Water District | Riverside, CA

Served as Project Manager for the development of a feasibility study and alternatives analysis fir the replacement of 20,000 water meters and the implementation of an AMI system. Prepared Request for Proposal (RFP) documents, managed the bidding process, and acted as a project inspector as an extension of District during the meter changeout / AMI installation.

AMI feasibility study / meter replacement project / AMI implementation

Project Manager | City of San Bruno | San Bruno, CA

Served as Project Manager for the development of a feasibility study and alternatives analysis fir the replacement of 10,500 water meters and the implementation of an AMI system. Prepared RFP documents, managed the bidding process, and acted as a project inspector as an extension of District during the meter changeout / AMI installation.

Water loss analysis / AMI system and meter installation

Project Manager, Engineer | Town of Hillsborough | Hillsborough, CA

Prepared an initial RFP for meter replacement with consideration of meter accuracy gains that was determined after the preparing a water audit and conducting leak surveys of approximately 100 miles of

mains using the acoustic leak detection equipment. The RFP was used to solicit pricing from leading AMI vendors with consideration of the Town's unique topography and sites for AMI collectors. Provided construction management and oversight of the installation of approximately 4,000 residential meters.

Stanford linear accelerator laboratory water loss and alternatives analysis

Project Manager |
Stanford Linear Accelerator Laboratory | Menlo Park, CA

Served as Project Manager for the performance of a water loss study to quantify leakage within the Stanford Linear Accelerator Center water system. Included were a meter study, leak detection study, data logging of source meters, mapping of the water system, and an alternatives analysis.

Water audit preparation / validation projects

Project Manager |
Various Water Agencies | California

Prepared dozens of AWWA water audits and performed multiple water audit validations throughout the state of California. Was instrumental in developing new guidelines for the AWWA Water Loss TAP Committee.

Air Force sustainable infrastructure assessments

Project Manager |
Multiple Air Force Bases | USA

Served as Project Manager providing facility assessments that analyse energy, condition, and space use. Included were data and cost estimates, recommended actions to improve performance and efficiencies at several bases across the US. Provided recommendations, data, and cost estimates to improve performance and efficiencies. Work included water assessments that helped to support decision making, financial management and reporting requirements on future capital investments and audit compliance with Air Force Audit Agency.

Career history

2021 - present	GHD, Senior Project Manager
2013 - 2021	MC Engineering Inc., Project Manager / Associate Engineer
2009 - 2013	AECOM, Water Quality Engineer
2007 - 2009	Alpine Engineering, Engineering Project Manager
2005 - 2007	Frayji Design Group
2004 - 2005	Boyle Engineering

Freddie Guerra

Project Director

Location

Dallas, TX

Experience

30 years

Qualifications/Accreditations

- MS, Environmental Science, Baylor University, Waco, TX, 1992
- BS, Biology & Chemistry, Baylor University, Waco, TX, 1990

Key technical skills

- Advanced Metering Infrastructure (AMI) Implementation
- Digital Platforms
- Smart Analytics

Memberships

- National Association of Clean Water Agencies
- Water Environment Association of Texas
- Water Environment Federation

Relevant experience summary

Freddie currently serves as GHD's Digital North America Water Market Leader and has 30 years of experience and understands innovation is the key to taking on water's biggest challenges. His focus has been assisting the public sector to connect deep human and data insights with the possibilities of technology to define and deliver new realities, with enhanced experiences that can improve lives and deliver extraordinary mission outcomes. Building on a long legacy of innovation, he has collaborated with clients in accelerating their digital transformation by bringing agile processes, human-centered design, digital platforms, and smart analytics to create better customer experiences and drive improved performance.

Advanced Metering Infrastructure

City of Houston AMI Implementation and Smart Water Utility

Technical Advisor
City of Houston | Houston, TX | 12/2021 - Ongoing | $54 million

City of Houston is deploying over 420,000+ endpoints including infrastructure for transmitting and receiving data, hardware, software, and training. Project included the development of a roadmap to go beyond AMI and leverage SENSUS' FlexNet system to strategic deploy water meters with pressure and temperature sensors as well as pressure sensors within the distribution system. City is also considering leveraging the system for a flood warning system. Led efforts to create awareness across Houston Water, facilitated meeting, solicited buy-in with roadmap, and developed partnership with Microsoft to leverage systems integration funding available to the City via MS.

City of Wylie AMI Implementation - Performance Contracting

Owner's Representative
City of Wylie | Wylie, TX | 3/2019 - Ongoing | $16 million

City of Wylie replaced 31,000 endpoints and installed a AMI system via performance contracting. Served the owner's representative from solicitation to kick-off of the project. Developed specifications to integrated smart technologies and innovations as part of the AMI system allowing the City to consider leveraging AMI to control street lights and school zone signals. Project allowed City to divert Capital Improvements Program (CIP) funding for the rehabilitation of a water storage tank and much needed pipeline repairs and replacements.

The Woodlands Water Agency AMI Implementation - Performance Contracting

Owner's Representative
The Woodlands Water Agency | The Woodlands, TX | 4/2019 - Ongoing | $18 million

The Woodlands Water Agency replaced 34,000 endpoints and installed an AMI system via performance contracting. Served the owner's representative from solicitation to kick-off of the project. Developed specifications to integrated smart technologies and innovations and to potentially leverage communication network to lease to nearby communities. Guided client to static meters due to warranties and water conservation efforts.

City of Rio Rancho AMI Implementation and Smart Solutions

Technical Advisor
City of Rio Rancho | Rio Rancho, NM | 11/2021 - Ongoing | $21 million

City of Rio Rancho is seeking to replace 14,000+ endpoints, as well as build a smart water system. The City is seeking to include leak detection, pressure modulation, water quality, and smart pumping. Assisted with the develop of strategies and workplans to phase technologies into the AMI deployment.

City of Mesa AMI Implementation - Water, Gas, and Electric

Technical Advisor
City of Mesa | Mesa, AZ | 10/2021 - Ongoing | $55 million

City of Mesa is seeking to convert to an AMI which includes 148,000 water; 63,000 gas; and 16,700 electric meters. Convinced City to utilize a licensed frequency to minimize interferences, as well as using one vendor to provide all meters.

Dallas Water Utilities AMI Business Case and Program Management

Technical Advisor
Dallas Water Utilities | Dallas, TX | 6/2019 - Ongoing | $98 million

Dallas Water Utilities is seeking to replace and/or retrofit 320,000+ endpoints. Developed workplans for evaluating billing services, field operations, and more. Introduced "going beyond AMI" concepts and leveraging AMI system to provide greater visibility and control of the distribution system.

Forth Worth Water Department AMI Implementation

Technical Advisor
Forth Worth Water Department | Fort Worth, TX | 9/2015 - Ongoing | $72 million

City of Fort Worth deployed 259,000+ endpoints along with implementing a "myH2O program" as a customer portal. Emphasis was focused on increasing participation of portal through community outreach and media campaigns. Provide input related to type of meters and communication system.

Master Planning & Risk Assessment, CIP Prioritization, + Digital Solutions

Dallas Water Utilities (DWU) Comprehensive Water Distribution System Assessment

Technical Advisor
DWU | Dallas, TX | 12/2018 - Ongoing | $5 million

Assisted in the development a baseline risk framework for all DWU assets considering their Probability of Failure and Consequence of Failure. Through this method, a risk-prioritized CIP for DWU's water mains and pumping and storage facilities was developed, which included a prioritization scheme with a list of triggers that signal the need for an identified project, its general timeline for implementation, and projected repair or replacement costs. In addition to this comprehensive CIP, collaborated with DWU staff to develop a set of key performance indicators and a data visualization dashboard schema that managed water distribution assets to their lowest lifecycle costs.

Dallas Water Utilities Comprehensive Wastewater Distribution System Assessment

Technical Advisor
Dallas Water Utilities | Dallas, TX | 12/2017 - 2020 | $4.2 million

Assisted merging model data to create a CIP Prioritization Tool using InfoAsset Planner, which incorporated hydraulic components and facilitated decision making through a decision tree-based system to determine how projects should be selected and ordered. The new CIP Prioritization Tool provided DWU with the ability to dynamically determine necessary projects as essential to wastewater collection system operations and maintenance. As a result, DWU could focus budgeted CIP dollars on projects that were needed based on priority versus completing projects that are "next on the list."

City of Irving Holistic, Risk-Based Water Storage Tank Management Program

Project Manager
City of Irving | Irving, TX | 8/2014 - 2015 | $620,000

Created a holistic, risk-based approach for the City's 21 water storage facilities to support Governmental Accounting Standards Board (GASB) 34 compliance, as well as significantly lower depreciation costs. Established a risk-based prioritization for their CIP & Operations and Maintenance (O&M) of storage tanks by leveraging detailed annual and comprehensive reports, periodic interior cleanings / disinfections, conditions assessments, and preventative maintenance to extend

the life of the water storage tank indefinitely and eliminate the need for emergency repair funds by spending the “right dollar, at the right time on the right tank.”

Career history

12022 - present	GHD, North America Digital Water Market Leader
9/2020 - 2021	Xylem Inc., Client Solutions Manager – Digital Solutions
7/2018 - 9/2022	Jones Carter Inc., Business Development Manager – Water & Wastewater

Jose Diaz-Mendez

Data Lead

Location

Rancho Cordova, CA

Experience

6 years

Qualifications/Accreditations

– BS, Civil Engineering, California State University, Sacramento, CA, 2016

Key technical skills

- Water Pipeline Design
- Water Loss Analysis
- Meter Data Management Software
- ESRI GIS ArcPRO, ArcCollector, Data Analysis
- Database Development
- EOS / Trimble GNSS Receiver

Memberships

– American Water Works Association, Meter Committee
– American Water Works Association, Water Loss Control Committee
– Tau Beta Pi the Engineering Honor Society

Relevant experience summary

Jose Antonio Diaz-Mendez has extensive experience working as a civil engineer on water, wastewater, and water efficiency engineering projects while serving multiple clients in California. His background has involved serving as a project manager, project engineer, and a construction project superintendent for water meter changeout / Advanced Metering Infrastructure (AMI) implementation projects, and civil inspector for potable distribution infrastructure installation and sanitary sewer lining Cured-in-Place-Pipe Lining (CIPP) / dig and replace projects. He has developed unique skills specific to water infrastructure projects that include construction management, Automated Meter Reading (AMR) / AMI data management, Geographic Information System (GIS) mapping, asset management development, water loss control, and the acquisition of project funding.

US Department of Agriculture (USDA) Funded Infrastructure / Water Meter Replacement / AMR Implementation / Water Loss Reduction Improvement Projects / Sewer Main and Laterals Lining Project / Inflow & Infiltration Study

Project Engineer / Lead Field Inspector
Clearlake Oaks County Water District | Clearlake Oaks, CA | $7 million

Served as Project Engineer and Lead Field Inspector this $7 million USDA funded water system improvement project. The project included the replacement of over 2,000 water meters with AMR meter reading technology, the installation of two miles of new distribution mains within the district including all applicable appurtenances, four District Metering Areas (DMA's) meters with cellular AMI technology, the installation of 800 new backflow devices, and a new water tank foundation and pump house. Duties also included Civil 3D design, ArcGIS Pro database creation, and all inspection during the project.

Also included were existing meter field studies, leak detection survey, determination of meter type and technology type, budget allocations, pay requests, change orders, Requests for Information (RFI's) and submittal review. Collected data and monitored collection system as an integral component of the Infiltration and Inflow (I&I) Study to isolate problematic areas. Developed a detailed collection system and distribution system GIS map book with field verification of the rim elevations, invert elevations, valve locations, and Global Positioning System (GPS) coordinates of the District's assets. Assisted in evaluating and developing influent scenarios corresponding to waste discharge and potential NPDES discharge options associated with the Wastewater Treatment Plant (WWTP). Completed an acoustic leak detection survey of approximately 18.5 miles of the distribution system utilizing electroacoustic water leak locator with ground mic, noise loggers, and HL 5000 correlators. Developed ranking criteria for distribution system based on leak history, leak detection investigation, pipe type, size, and pressure zones. Designed and drafted plans for 2.0 miles of water

distribution system emergency line replacement and 1.5 miles of sewer CIPP rehabilitation / replacement. Conducted field inspection as an alternate inspector for a USDA funded project in the construction of a clarifier and 5.0 miles of force main installation.

Blue Lake Springs Mutual Water Company Water System Improvement Projects

Project Engineer, Lead Civil Inspector
Blue Lake Springs Mutual Water Company (BLSMWC) | Arnold, CA

Responsible for managing and preparing construction progress payments, change orders, RFI's, project schedule, weekly progress meetings, reviewing certified payrolls. Conducted construction staking for new house services / meters, Pressure Reducing Valve (PRV) stations, and fire hydrants. Served as Lead Civil Inspector and required to document pre-construction conditions using photographs, written notes, and video. Observed daily to construction to assure that the contract documents / plan and specifications were being fulfilled and closely followed. Inspected the construction methods, material, techniques, and sequences to evaluate the Contractor's compliance with the construction documents, provide observation of material testing, and review all construction prior to burial. Provided the necessary quality control during construction and quality assurance through materials testing. Worked directly with the Contractor to perform routine Stormwater Pollution Prevention Plan (SWPPP) monitoring reviews of the project and assured all Best Management Practices (BMP's) were being adhered to. Closely coordinated pipeline testing(s) with all responsible parties, including the BLSMWC staff. Developed ArcGIS database from existing water infrastructure modelling nodes, L&S / HDR ArcGIS schematic design, and the BLSMWC staff knowledge of the system. Created an interactive database to provide the capability to interactively and graphically access and query the data to analyse and visualize the characteristics of 12.5 miles of the water distribution system. Developed a full asset management program to be used for assisting the Water Company in properly managing their short-term and long-term water infrastructure investments.

AMI Feasibility Study / Meter Replacement Project / AMI Implementation

Project Engineer
City of San Bruno | San Bruno, CA

Served as Project Engineer for the development of a feasibility study and alternatives analysis for the replacement of 10,500 water meters and the implementation of an AMI system. Prepared Request for Proposal (RFP) documents, conducted field study, managed the bidding process, and acted as a project oversight/inspector as an extension of District during the meter changeout / AMI implementation. Conducted field survey of ~800 intermediate to large meters for the purpose of determining possibility of replacement/repair.

AMI Feasibility Study / Intermediate Meter Testing / Meter Replacement Project

Project Manager
El Toro Water District | Lake Forest, CA

Served as Project Manager for the development of both a feasibility study and alternatives analysis for installing AMI technology and a related meter changeout program for approximately 10,000 metered services. Included in the study was a Supervisory Control and Data Acquisition (SCADA) integration as well. A separate analysis of the District's two-inch meter population was performed that led to a discovery of a major water loss issue. The results of the project helped develop a business case that the District is using to help finance their upcoming AMI implementation project. Results of the intermediate meter projects are to be presented at the national AWWA conference in Las Vegas, Nevada.

Western Municipal Water District AMI/AMR RFP and Implementation Project

Project Manager
Western Municipal Water District | Riverside County, CA

Managed the implementation and installation of ~24,000 meters, which included the field survey of all the District's commercial and residential meters to developed a set criteria on which to rank water meters for testing and replacement while calculating related projected revenue increases. Developed an RFP to replace and install new meters and retrofit existing meters with endpoints for a Neptune LORA AMI / AMR system. Developed meter installation routing maps, mapped completed installs, and validated all meter installs for 11,000 small, intermediate, and large meters.

City of Livermore AMI Implementation Project

Project Manager
City of Livermore | Livermore, CA

Served as Project Manager for the City of Livermore to oversee all data management, GIS mapping, and data verification. Implemented project controls, developed project schedule and initial work plan. Employed, trained, supervised, and implemented quality control measures with a field crew of eight laborers to facilitate the installation of approximately 10,300 Sensus 520M's to existing residential and commercial meters, registers, and boxes / lids.

Town of Hillsborough Leak Detection Study / Meter AMI Project Implementation and Management

Project Engineer
Town of Hillsborough | Hillsborough, CA

Conducted an acoustic leak detection survey of approximately 100-miles of the distribution system to address real and apparent losses and related monetary. Obtained GPS coordinates of the Town's hydrants, water valves, and potential leaks imported into GIS for future use in an asset management program. Assisted Golden State Flow Measurement (GSFM) in data management, GIS mapping, and data validation of approximately 4,300-meter change-outs with Sensus 520M endpoints. Prepared GIS maps and RNI status updates in support of the GSFM subcontractor's field crews on a weekly basis.

City of Orland / Placerville / Chowchilla Leak Detection Study

Project Manager
City of Orland / Placerville / Chowchilla | Orland, CA; Placerville, CA; Chowchilla, CA

Managed and performed a preliminary leak survey of approximately 35-miles of cast iron, ductile iron, and C900 Polyvinyl Chloride (PVC) water mains for the City of Chowchilla. Created survey forms and a GIS map to analyze and understand patterns and relationships of the distribution system pipe age, size, and material to locate leaks in subsequent phases using leak correlating methods and related equipment to pinpoint actual leak locations prior to repairs.

Georgetown Divide Public Utility District AMR Meter RFP

Project Engineer
Georgetown Divide Public Utility District | Georgetown, CA

Developed an RFP for Georgetown Divide Public Utility District to replace approximately 4,000 meters and implement an AMR read system. Assisted in facilitating a pre-bid meeting with potential contractors and provided meeting munities to all attendees. Compiled questions related to the RFP from potential contractors and sent out a formal response and provided addendums to the RFP as required.

Career history

2022 - present	GHD, Project Engineer
2015 - 2022	MC Engineering Inc., Project Manager / Associate Engineer

GHD Digital

Bhavin Bhayani PHD

Machine Learning / Analytics Support

Location

Syracuse, NY

Experience

10 years

Qualifications/Accreditations

- PhD, Bioprocess Engineering, State University of New York College of Environmental Science and Forestry, Syracuse, NY, 2013
- MS, Civil Engineering, State University of New York College of Environmental Science and Forestry, Syracuse, NY, 2007
- BS, Environmental Engineering, Shivaj University, Kolhapur, India, 2005

Key technical skills

- Data Analysis for Process Optimization
- Environmental Regulations & Compliance
- Strategic Energy Management

Memberships

- Air & Waste Management Association, Central New York Chapter
- Green Belt Six Sigma, State University of New York College of Environmental Science and Forestry, 2010

Relevant experience summary

Bhavin leads the development of Advanced Analytics offerings for GHD's Water Treatment & Desalination, Wastewater Treatment & Recycling and Water Transmission & Distribution Service Line. These include software tools and analytical/statistical methodologies, whose collective goal is to support our technical teams and subject matter experts in all stages of a project. Bhavin is a skilled ideator who is driven by an intrinsic curiosity about client challenges by combining this drive with a deep knowledge of what's possible using the latest artificial intelligence and machine learning technologies. Bhavin has more than 10 years of diverse experience operations management and design of municipal and industrial water/wastewater, production, and processing projects, as well as renewable energy projects. He also has specialized experience managing, implementing facility operations and compliance systems for various environments including municipal, institutional, and industrial applications. Bhavin has also led the innovation in emerging contaminant treatment for a consulting firm with several years of completing various treatability studies.

Data Science and Stewardship

Water Replenishment District Automatic Report Generation

Senior Data Scientist
GHD

Provided leadership and developed the framework of an automatization process for report generation in a water treatment facility using an interface between Excel, SQL, and Python. Conducted Data Mining and stewarded the creation of a tool and automation. The process includes data ingestion, normalization of multiple parameters, and automated chart generation.

Several Water Treatment Plants (WTP's) and Wastewater Treatment Plants (WWTP's)

Operations Process Engineer, Data Manager
Camden Group

Managed the data from several sources including Supervisory Control and Data Acquisition (SCADA), laboratory, third contractor party and operations. Conducted data analysis to remove noise and develop predictive process capabilities for two Water Resource Recovery Facilities (WRRF), analyzed data for non-compliance and for rebuttal of regulatory agency's hypothesis, developed a multivariate model for process performance resulting in a decrease of 7% in energy consumption.

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Several WTP's and WWTP's

Operations Process Engineer, Data Manager
Camden Group

Prepared regulatory and monthly project status reports, conducted annual audit of industrial facilities for their conformance to standards/regulations and required treatment efficacy. Managed the environmental compliance of three facilities resulting in 5% reduction in non-compliance events. Developed a proprietary dashboard to enable efficient data collection, validation, and analysis. Managed the laboratory functions (sampling, Quality Assurance/Quality Control (QA/QC) and data analysis) of two WRRF's.

Municipal Water Authority Water Treatment Facility

Senior Data Scientist
Municipal Water Authority | GHD

Stewarded projects on increasing operational efficiencies for a water treatment facility. Analyzed SCADA and water quality monitoring data to identify anomalies and trends in data. Created the framework and analyzed the operations and process units for their efficiency for producing potable water (Finished Water).

Industrial Wastewater Discharge

Senior Data Scientist
GHD

Developed the process of data digitization and analysis for an industrial client. Used Python to analyze years' worth of data and identified outliers and corrective actions. Identified anomalies and patterns in data helping the client perform Root Cause Analysis.

Resolving Strategic Issues for Buffalo Water

Senior Data Scientist
GHD

Managed the project from inception and provided thought leadership. Created the data analysis framework to predict the likelihood of lead service lines and water main breaks. Additional layers to enhance the capital planning process are being incorporated by analyzing historical cost data. Several silos were broken down to connect data including water quality, demographics, SCADA, and other Computerized Maintenance Management System (CMMS) systems.

Inflow and Infiltration Analysis Tools

Senior Data Scientist
GHD

Provided domain expertise and project ownership, created the framework of a toolset for the analysis of Inflow and Infiltration in sewer systems integrating the different steps of the process, from the data ingestion to the analysis and report creation using Python.

Several Sewage Authorities

Senior Data Scientist
GHD

Provided leadership and developed the framework for analyzing video footages and annotating the defects per the National Steel and Shipbuilding Company (NASSCO) Pipeline Assessment Certification Program (PACP), Water System Operations (WSO), and European Standards. Analyzed several Closed-Circuit Television (CCTV) footages for the defects in sewer lines and compared them with analysis from manual review.

Proposal Writing Team

Senior Data Scientist
GHD

Supported the proposal writing efforts in the Advanced Analytics team by gathering information about past and present project experiences and a broad description of GHD Digital capabilities to respond to different proposal requests.

Engineering

Various Projects

Innovation Engineer
Several Clients | OBG

Served as Project Engineer for improvements associated with advanced processes in water and wastewater treatment. Project's included conducting treatability studies on emerging contaminants, landfill leachates, and advanced oxidation processes and scaling the process on site. Performed technology evaluation (due diligence), developed proposals and budget estimations, completed multivariate data analysis to identify correlation and perform root cause analysis, resolved issues concerning Intellectual Property (IP) and contractual obligations.

Development

Co-Founder
Avatar Sustainable Technologies

Venture owner and responsible for the development of proprietary process and scaling it to meet customer's requirements. Efforts included collaborating with several stakeholders to develop a process master plan and logistics master plan to upgrading the waste and produce high value biochemicals. Performed data analysis of laboratory and scale up data to optimize the process, conducted client site assessments, documented systems, prepared technical memoranda of

findings, prepared gap analysis, and prepared techno-economic documents to support making improvements to the client's systems.

Production Optimization

Product Formulator
Car Freshener Corporation

Sustainably reformulated three product lines and decreased their environmental footprint, scaled the process resulting in increased sales volume by 8% on 70-year-old products. Completed techno-economic analysis to understand the impact of reformulation on P&L, saved >$200,000 by optimizing production lines resulting in decreased product loss. Set up collaboration with several material suppliers and production team to develop a comprehensive New Product Development Plan. Also developed strategies for environmental compliance and led the effort to meet permits globally.

Publications

- Bhayani, Bhavin V., and Bandaru V. Ramarao. "Filtration-Based Separations in the Biorefinery." Separation and Purification Technologies in Biorefineries (2013): 327-349.
- Bhayani, Bhavin Vijay. Studies of lignocellulosics processing: Microfiltration, flocculation and saccharification in biorefineries. State University of New York College of Environmental Science and Forestry, 2013.
- Bhayani, Bhavin. Investigations on the Efficiency of Enhanced Porosity Concrete in Retaining Vehicular Oil Spills: A Thesis. Diss. Clarkson University, 2007.

Career history

2020 - present	GHD, Senior Data Scientist
2017 - 2020	Camden Group Inc., Project Manager
2016 - 2017	O'Brien & Gere, Engineer
2013 - 2015	Car Freshener Corporation, Product Formulator

GHD Digital

Kunal Deopare

Solution and Delivery

Location

Monroe Township, NJ, USA

Experience

8 years

Qualifications/Accreditations

- Master of Science, Information Technology, Bentley University, 2014
- Bachelor of Science, Corporate Finance & Accounting, Bentley University, 2013

Key technical skills

- Digital Transformation
- Strategic & Technical Product Management
- Full-stack Enterprise Application Development (cloud, web / mobile, etc.)
- Industrial IoT, Cloud Technologies, Web / Mobile, API

Memberships

- AWWA
- SWAN

Relevant experience summary

Kunal is a Digital Solution Leader at GHD Digital, leading the buildout of Industrial IoT solutions for Water. He has 7+ years of technical and managerial experience leading small and large agile software engineering teams, launching new products, and successfully building and executing product roadmaps through their entire lifecycle within the Water industry. Passionate about solving problems through digital solutions and highly customer-facing, Kunal has leveraged his technology and business backgrounds to drive digital transformation for internal and external customers during his time at SUEZ and GE Water. He uses his strong foundations in business, finance, operations, and IT to build lasting partnerships across various functions. Has experience in building highly scalable enterprise products leveraging SaaS, web/mobile, API and cloud technologies.

Project Experience – Digital Solution Consulting

Digital Transformation, Industrial Water Treatment Systems

Solution & Delivery Leader
Suez Water Technologies & Solutions | Trevose, PA | May 2019 – July 2019

- Worked with several large oil refineries across the US to transform and enhance their water treatment processes through digital solutions. Solutions were piloted at one plant and then scaled to other plants.
- In one example, proposed installation of wireless tank sensors to allow transmission of chemical level within tank to Suez WTS' Industrial Internet of Things (IIoT) / remote monitoring web application (InSight). InSight leveraged analytics to forecast when tank would run out of chemical. Based on set thresholds, alarms would be raised to alert operators of low chemical level and work order was drafted in CRM system on behalf of operator, waiting to be approved. This solution was ultimately adopted by the refinery as it not only saved operators 2 to 3 days/week from walking around and manually measuring tank levels, but also made supply chain and operations more efficient by ensuring there was always adequate chemical to feed water treatment processes.
- In another example, data from key operational assets that was manually entered was automated into InSight. Then, assets were set up through a standardized approach (e.g., KPIs, measurements, metrics, analytics, etc.); assets included cooling towers, boilers, clarifiers, condensers, and RO membranes. Once operational data was regularly ingested, the RO Normalization and Condenser Performance analytics were deployed to optimize asset performance. Standard reports were built to provide operators with daily, weekly, and monthly performance reports – delivery of reports was automated and scheduled. Lastly, a next-generation dashboard was built for operators to view RO Normalization and related statistics. The refinery leveraged the level of standardization used at the pilot

plant to quickly onboard 8 other plants and gain the same operational benefits

Project Experience – Enterprise Data Systems & Advanced Analytics (AI/ML)

Advanced Analytics & Common Data Environment

Industrial Internet of Things (IoT) SME
Suez Water Technologies & Solutions | Trevose, PA | August 2019 – March 2020

- Helped strategize and build Suez Water's first common data environment with initial focus on machine/IoT data. Machine data (historical and current) was taken from InSight, cleaned and standardized, and stored into a data lake. An API-based access layer was put in front of the cleaned data to allow data scientists to explore the data and build analytics.
- Leveraging the access layer, data scientists were able to build a suite of predictive and performance-based analytics for RO membranes (e.g., RO normalization) and condensers (e.g., condenser efficiency, time-to-clean). The analytics were productionized and deployed in an analytics environment built to run complex algorithms. Once complete, they could be triggered whenever new machine data were ingested into InSight. An analytics dashboard for each suite (e.g., RO, Condenser) was created and integrated with InSight to allow operators to view critical asset data.
- This process became the blueprint for how analytics were developed and integrated back into the asset performance management tool for visualization and enhanced decision-making.

Enterprise Data Governance

Industrial IoT SME & Data Steward
Suez Water Technologies & Solutions | Trevose, PA | August 2019 – March 2020

- Engaged in defining and implementing a company-wide data governance framework during buildout of Suez Water's common data environment with specific responsibilities for IIoT / machine data.
- Framework highlighted specific data sources (e.g., IIoT / machine data, sales, finance, supply chain, etc.), their data stewards, and steward responsibilities. Responsibilities of data stewards included owning the business processes from which source data originate, defining business rules around how data is collected, stored, and accessed, and how it flows through the Suez Water ecosystem. Data stewards partnered with the IT team to ensure business rules were enforced through system controls and became the single point of contact for data quality control.
- As additional data sources are added to the data lake, the aforementioned process is used to define owners and enforce good data governance.

Project experience – Technical Product Management

API Development for IIoT Platform

Senior Staff Technical Product Manager
Suez Water Technologies & Solutions | Trevose, PA | November 2018 – April 2019

As part of the transformation of InSight from an internal application to a standalone Asset Performance Management solution, continued to productize the solution by enabling connectivity to/from any internal and external enterprise system (e.g., SAP, Salesforce, etc.) in order to modernize the platform's data ingestion framework. Leveraged Amazon's AWS cloud platform to host, secure, and scale InSight's public API layer.

- Owned complete lifecycle (technical & strategic) of this product feature from customer engagement to execution and delivery (design, build, launch) including interaction with software engineering and marketing teams, product champions, executive leadership, and vendors
- Worked across all stakeholders to hone-in on requirements, drive adoption, and evangelize new commercial models to drive new revenue streams through this feature
- Leveraged modern technologies on AWS cloud to build API layer including AWS API Gateway, JSON-based format, and secured through HTTPS protocol and private key access (i.e. no access without valid key). Swagger UI used for visualizing, documenting, and interacting with available APIs for application users, testers, and other personas

Career history

2020 - present	GHD, Digital Solution Leader
2016 - 2020	Suez Water Technologies & Solutions (Formerly GE Water Process & Technologies), Sr. Staff Technical Product Manager – IIoT
2014 - 2016	General Electric, Information Technology Leadership Program Associate

Edgar H Johnson

Senior Technical Review / QA/QC

Location

Adelaide, Australia

Experience

+35 years

Qualifications/Accreditations

- Bachelor of Commerce, 1997
- Laureatus (Doctorate) in Technology, 1987
- Master's Diploma in Technology (Water and Wastewater Engineering), 1984
- Diploma in Civil Engineering, 1977

Key technical skills

- In-depth knowledge of metrology.
- Unique understanding of technical aspects of fit-for-purpose advanced technologies.
- Ability to develop innovative models and technical solutions for complex interrelated water loss management projects.
- Pragmatic approach in the application of knowledge in the development and implementation of water efficiency strategies.

Memberships

- Chartered Professional Engineer (CPEng), NER, Member, Engineers Australia
- Professional Engineer (PrEng), Engineering Council of South Africa
- Fellow of the Water Institute of Southern Africa (WISA)
- Member of the International Water Association (IWA)

Relevant experience summary

Edgar has more than 35 years' international experience in water management and water/wastewater engineering. His advanced education in water engineering, his commerce degree as well as his specialised knowledge in water managing and engineering is demonstrated through the publication of more than 30 articles/ papers / research books related to this field. As an internationally recognized specialist in water efficiency, demand management, meters, and metering systems, he has successfully developed advanced plans for complex water issues and implemented sophisticated strategies that improved revenue and reduced costs for clients. Involvement with the International Water Association (IWA) Water Loss Specialist Group included leadership of its non-revenue water apparent loss (AL) initiative. Recipient in 2016 of GHD Chairman's Award for Global Technical Excellence. He was also selected as one-of-30 of Australia's Most Innovative Engineers by Engineers Australia in 2017. Finalist for GHD's 2021 Chair's Award for Technical Excellence.

Selected project experience

Smart Metering Foundations Project

Specialist Reviewer
Wellington Water Limited, New Zealand | January 2022 – Present

In developing a smart metering solution customized to the context and needs of Wellington Water, this role provides an independent and robust challenge against the Programme Principles and Investment Objectives as well as instils the client's confidence in the process and return on investment.

Audit of Large Water Supply Flow Meters

Water Loss Control Specialist & Principal Author
Cairns Regional Council, Queensland, Australia | October 2021 – December 2021

Detailed assessment of each segment of the data acquisition cycle (i.e., meters, SCADA system, application). Identified risks in the hardware, software, firmware, and human interfaces for each segment of the data pathway/chain that introduced data anomalies adversely influencing the calculation of water loss performance indicators. Identified innovative

technological, organizational, and process improvements as part of an options analysis framework.

Root Cause Assessment of Water Losses

Water Loss Control Specialist & Principal Author
Minister of Water and Petroleum, Qatar |
June 2021 – October 2021

Scoping study for a multiphase investigation as to the root cause of real (i.e., leakage) and apparent (i.e., metering & administrative) water losses within Qatar. Included the assessment of existing data relating to desalination plant output meters, 400,000 customer water meters, burst/leak histories, water balances, DMAs, etc. Analysis and preparation of data gap analysis, benchmarking, and project framing reports.

Water Loss Program support

Water Loss Control Specialist & Principal Author
Solano County Water Agency, CA, USA |
March 2020 – January 2021

Development and implementation of a 3-stage approach that assessed and complemented the traditional applied water loss audit framework. A unique sensitivity analysis process was developed to accurately identify water loss interventions. Preparation of detailed report including programs for focussed interventions. Detailed in an AWA eJournal paper (Vol. 5 No.4).

Non-Revenue Water (NRW) Audit

Water Loss Control Specialist & Principal Author
Hunter Water, Newcastle, NSW, Australia |
2019 – 2020

Reviewed all components and influencing factors of NRW. Provided a critical review of the assets, data sources, assumptions, models, systems, processes, and procedures used to derive the reported level NRW. Assessed the current status quo, relevance to best practice, and identification of future innovative interventions addressing the components of NRW. Prepared an action plan and specifications to reduce all categories of water losses.

Intelligent/Smart Water Metering Systems

Specialist Advisor & Principal Author
Goulburn Valley Water, Victoria, Australia |
2019 – 2020

Assessed the metrology, communication backbone, and data management systems of several technologies within the framework of a Data Acquisition Cycle. Identified critical technical considerations associated with these technologies, their Capex, Opex, and lifecycle costs as well as financial modelling of potential solutions. Included multi-criteria analysis, development of specifications, service levels performance benchmarks, and an adjudication process for submissions/tenders.

Smart Metering & Unit Metering Assessment

Specialist Advisor & Principal Author
Icon Water, ACT, Australia | 2018 – 2019

Reviewed Icon Water's position on smart metering through assessment of recent trials and studies and current technologies, and update of business case scenarios and modelling. Included analysis of complete intelligent network technology options such as smart sensors, communications, systems integration, and network tools. Performed review and options assessment for unit metering in the Australian utility market, ACT development trends, customer segmentation, and impacts to both the customers and Icon Water.

Development of a Strategy and Action Plan for the Management of NRW

Water Loss Control Specialist & Principal Author
TasWater, Tasmania, Australia | 2018

Assessment of the various factors influencing water losses, the development of techniques and procedures, tailored to the specific characteristics of the network and local influencing factors, to address each of the components in order of priority. Strategy identified practical water demand management and conservation solutions.

Development of Digital Water Metering Assessment and Ranking Tool

Specialist Advisor & Principal Author
Power & Water Corp | NT, Australia | 2018

Assessed existing AMI technologies in operation and undertook a scan of commercially available and emerging technologies for use in both urban areas and remote communities. Included multi-criteria analysis, lifecycle assessment, in-service testing/analysis, formulation of a meter replacement strategy, development a business case for current mechanical meters, and future advanced intelligent metering system. Pilot AMI project of 1,000 smart water meters commenced in 2018.

Summary of projects undertaken, and roles held prior to 2012 can be provided on request

Mike Worlton PE, BCEE, LEED AP

Key Relationship Manager / Strategic Support

Location
Phoenix, AZ

Experience
26 years

Qualifications/Accreditations
- MS, Civil Engineering, Brigham Young University, Provo, UT, 1997
- BS, Civil Engineering, Brigham Young University, Provo, UT, 1996
- Civil Engineer, AZ #35265, CA #60146, UT #324120-2202, TX #108034, NM #22639
- Certified Professional in Erosion and Sediment Control #2837
- Arizona Department of Environmental Quality (ADEQ) Wastewater Treatment Plant (WWTP) Operator, Grade IV #43048
- ADEQ Wastewater Collection System Operator, Grade IV #43049
- Leadership in Energy and Environmental Design (LEED) Accredited Professional (AP)
- ADEQ Water Treatment Plant Operator, Grade IV #56869
- ADEQ Water Distribution System Operator, Grade IV #56870; Board Certified Environmental Engineer

Key technical skills
- Water Modelling
- Water Quality Analysis

Relevant experience summary

Michael Worlton is actively involved in directing, managing, and designing water projects throughout the West. He has been involved with water modelling, analysis of water quality, and mitigation of Disinfection By-Products (DBP's) for over 26 years.

Project experience – Waterline

Chaparral Water Treatment Plant

Principal
City of Scottsdale | Scottsdale, AZ | 2018

Served as Principal for the design of multiple improvements at the City's Chaparral Water Treatment Plant. The $57 million Chaparral Water Treatment Plant has been in operation since 2006. GHD has completed 11 major improvements at this facility since 2011 as a prime consultant, including the design of the addition of an aluminum chlorohydrate storage and injection system to replace the existing ferric sulfate system. GHD also designed improvements to allow the existing plant membrane facilities to operate in a batch mode in lieu of the feed-and-bleed process. GHD also designed the replacement of the existing intake screens. The existing mechanical screen was replaced with a new unit and new solids pump station to convey screenings to a sewer. These projects were delivered via both design-bid-build and through the Job Order Contractor (JOC) delivery methods.

Pecan WWTP

Principal
EPCOR Water | San Tan Valley, AZ | 2020

Served as Principal for this project which included engineering and permitting support through a design-build partnership with MGC Contracting, for a 1.0 mgd expansion at the Pecan Water Reclamation Plant, utilizing an aero-mod, aerobic secondary process. This expansion also includes complete replacement of the influent headworks for the facility to accommodate an average daily flow of 4.0 mgd and a peak inflow of 12.0 mgd. Specific headworks improvements included a new (four) pump influent lift station, new influent mechanical screen, new grit removal and classification system, and new flow control distribution to the secondary treatment trains.

Desalination Plant Siting Evaluation

Project Support
Poseidon Resources | Corpus Christi, TX | 2013

Assisted Poseidon Resources with preliminary siting study for co-locating a seawater desalination water treatment plant with a power generation stations near Corpus Christi, Texas. The project includes visiting two power generation stations to evaluate the existing intake and discharge structures, identify available land area, and discuss potential issues with station staff. It also includes generating preliminary siting study that illustrates the available land and other information gathered.

Bell Road Force Main Replacement

Project Manager
EPCOR Water | Surprise, AZ

Served as Project Manager for planning, design, permitting, and Construction Management At-Risk (CMAR) coordination for the replacement of 3.3 miles of 18-inch High Density Polyethylene (HDPE) pipeline within the City of Surprise and unincorporated Maricopa County, Arizona. Services included an alignment study, final design, construction documents, CMAR coordination, and extensive coordination with the City of Surprise, Arizona Public Service, Arizona State Land Department, and the Flood Control District of Maricopa County to reduce project costs and meet the client's accelerated schedule.

Water Main Replacements Harrison Street – Van Buren Street/31st Avenue – 27th Avenue

Engineer-of-Record
City of Phoenix | Phoenix, AZ

Served as Engineer-of-Record for replacement of aging small diameter galvanized iron, cast iron and Class 100 Asbestos-Cement (AC) piping. This project covers about 21,000 linear feet of replacement, 12 cut and plugs, 32 hydrants, and 600 service connections. Waterlines located in alleyways will also be relocated to the street to improve maintenance crew's accessibility during emergency repairs. This project included coordination and permitting of a crossing through Union Pacific Railroad (UPRR) right of way.

Water Main Replacements Maricopa Freeway to Buckeye Road, 7th Avenue to Central Avenue

Engineer-of-Record
City of Phoenix | Phoenix, AZ

Served as Engineer-of-Record for replacement of aging small diameter galvanized iron, cast iron and Class 100 AC piping. This project covers about 26,000 linear feet of replacement (4-12 inches in diameter), 36 cut and plugs, 79 hydrants, and 284 service connections. The project area, located in Downtown Phoenix, includes services to a hospital, school, and park.

Water Main Replacements 16th Street and Bethany Home Road

Engineer-of-Record
City of Phoenix | Phoenix, AZ

Served as Engineer-of-Record for the design of nearly 20,000 linear feet of water main replacements for the City of Phoenix.

City of Douglas Water Line Improvements

Engineer
City of Douglas | Douglas, AZ

Served as Engineer for over 19,000 linear feet of water line replacement. The project included coordination with US Army Corps of Engineers, City of Douglas, ADEQ, and Cochise County Transportation Department.

City of Phoenix Water Main Replacement Program

Project Manager
City of Phoenix | Phoenix, AZ

Served as Project Manager for the replacement of approximately 10,000 linear feet of water main along 7th Avenue between Apache and Jackson. The project included design of a railroad crossing, sewer service connections, utility research, public water line abandonment, new fire hydrants, and topographic surveys and base mapping.

Carefree Vistas Water Design

Project Manager
Town of Carefree | Carefree, AZ

Served as Project Manager for the design of over two miles of waterline to supply water to customers in Cave Creek's Water service area.

Paradise Acres Water Improvements

Project Manager
City of Surprise | Surprise, AZ

Responsible for design of over 6,000 linear feet of waterline replacement, right of way acquisition, neighborhood and council meetings, water service exhibits, permitting, and specifications.

City of Phoenix Water Mains Replacement Program

Project Manager
City of Phoenix | Phoenix, AZ

Served as Project Manager for replacement of 10,000 linear feet of water main from 7th Avenue to Central

between Indian School and Campbell. The project included design of 363 service connections, water line abandonment, public outreach, and topographic surveys and base mapping.

115th Avenue Transmission Main Extension

Project Manager
City of Avondale | Avondale, AZ

Served as Project Manager for design of approximately one mile of 24-inch water transmission main crossing beneath UPRR, box culverts, and storm drains.

Square Mile Neighborhood Reconstruction

Project Engineer
City of Surprise | Surprise, AZ

Served as Project Engineer for design of approximately five miles of water main replacements within existing local and collector streets.

East Avondale Waterline Replacements

Project Engineer
City of Avondale | Avondale, AZ

Served as Project Engineer for replacement of approximately three miles of eight-inch waterline in a historic part of the City. The design included survey, cost estimates, utility coordination, permitting, and review of bids.

Park Road Waterline

Design Engineer
City of Avondale | Avondale, AZ

Served as Design Engineer for a 20-inch waterline crossing within the Agua Fria River parallel to McDowell Road in Avondale, Arizona. This project included preparation of specifications and construction inspection.

Baseline Road Waterline

Design Engineer
City of Apache Junction | Apache Junction, AZ

Served as Design Engineer for a 12-inch waterline along Baseline Road for the City of Apache Junction. The project included survey, preparation, utility coordination, and design plans and specifications.

Project experience – Wastewater

91st Avenue WWTP Digester #11 Dome Replacement

Project Principal
City of Phoenix | Phoenix, AZ

Served as Project Principal for design and construction services for the replacement of a fixed dome at the City of Phoenix's 180 mgd WWTP. The scope included structural evaluation and physical inspection of Digesters #10, 11, and 12. It also included video inspection of the select piping, 3D scanning of the domes, and design of a fixed cover for Digester #11. Construction administration and inspection services included bid phase support, project administration, and on-site project representation for the construction of the steel dome cover for Digester #11.

Sundance WWTP

Project Engineer
City of Buckeye | Buckeye, AZ | 2001

Served as Project Engineer for program management services for this 3.6-million-gallon WWTP project. Prepared a request for proposals for this design, build, and finance and operate project. The project also included proposal review, evaluation and selection, development of wastewater flow projections and design requirements, preparation of MAG 208 Amendment, assisting in preparation of Aquifer Protection Permit (APP), and reuse permits.

City of Douglas WWTP

Project Manager
City of Douglas | Douglas, AZ

Served as Project Manager for preparation of a design report for the expansion of this 2.0 mgd WWTP for the City of Douglas, Arizona. Assisted with the preparation of an APP and coordinated permitting of the facility expansion.

Cave Creek Water Treatment Plant

Project Manager
Town of Cave Creek | Cave Creek, AZ

Served as Project Manager for a one-million-gallon water treatment plant upgrade. This project included preparation of preliminary and final design reports for approval to Environmental Service Department of Maricopa County. Also coordinated the electrical design including radio controls.

Kabul Military Training Center WWTP

Project Engineer
Afghan Armed Forces | Kabul, Afghanistan | 2009

Provided quality control reviews for the design of a 750,000 gpd WWTP that served Afghan Defense University for the Department of the Air Force. Design included head works, lift station, equalization basin, extended aeration, anoxic zone, primary clarification, chlorination, digestion, and sludge handling facilities. The project was designed to accommodate strong wastewater streams and large variations in temperature.

Arizona Department of Corrections Water & Wastewater Contract Operations

Project Director
Arizona Department of Corrections | Arizona

Served as Project Director for water and wastewater operations contracts at several state prisons. These include Arizona State Prison Complex (ASPC) Lewis, ASPC Yuma, and ASPC Winslow/Apache. The facilities for each prison are unique but include an Electrodialysis Reversal (EDR) water treatment plant, an extended aeration wastewater treatment facility, facultative ponds, water supply wells, water storage tanks, and booster pump facilities. Oversees client relations, manpower, contracts, and authorizes purchases for these facilities.

Tolleson WWTP SWPPP

Project Manager
City of Tolleson | Tolleson, AZ

Provided oversight and Quality Assurance (QA) reviews for the preparation of a Storm Water Pollution Prevention Plan (SWPPP) for the City of Tolleson WWTP.

Tolleson WWTP Annual Biosolids Report

Project Manager
City of Tolleson | Tolleson, AZ | 2004

Served as Project Manager for the production of the City of Tolleson WWTP's 2003 Biosolids Report as required by 40 Code of Federal Regulations (CFR) 503. This report documented the plant's existing treatment process, monthly sludge production, and laboratory test results related to handling and disposal of Biosolids. The Tolleson plant was designed to treat wastewater collected within the City of Tolleson, City of Peoria, and Sun City. The total treatment capacity of this plant is 17.5 mgd.

Sweetwater / Hagan Wastewater Pump Station

Engineer-of-Record
Lake Havasu City | Lake Havasu City, AZ

Served as Engineer-of-Record for the design of this wastewater pump station including five submersible pumps with a capacity of over 10 mgd. The station included biological and chemical odor control, a diversion structure, and two wet wells. Also provided technical oversight and quality control for nearly two miles of 16-inch force main and approximately 1.5 miles of 21-inch gravity sewer associated with this project.

Camp Pendleton P-1046 North Area Wastewater Conveyance Design

Project Manager
City of San Diego | San Diego, CA

Served as Project Manager for the design of two pump stations and over a mile of force main (10 to 21-inch diameter) and the decommissioning of a wastewater treatment facility at Marine Corps Base Camp Pendleton. Project design included hydraulic analysis, establishment of design criteria, pipeline alignment review and evaluation, 60% design plans, and preparation of a Request for Proposal (RFP) package and cost estimate. Designs were in accordance with the Department of Defense's Unified Facilities Criteria.

Camp Tombstone Bastion Sanitary Sewer Review

Project Engineer
Camp Tombstone Bastion Sanitary Sewer Review | Afghanistan Ministry of Defense | Helmand Province, Afghanistan

Provided technical support and quality control reviews for the sewer improvements to serve Camp Tombstone Bastion. The review included evaluating design assumptions with reference to the Department of Defense's Unified Facility Criteria, providing value engineering recommendations and creating a comment register. The proposed sewer improvements included 14 pump stations ranging from 50-2,000 gpm and several miles of pipeline.

Northeast Buckeye Sewer Collection System

Project Manager
City of Buckeye | Buckeye, AZ

Served as Project Manager for the design and construction of approximately 2.0 miles of gravity sewer line, a 9.76 mgd sewer pump station, and approximately 2.4 miles of sewer force main. This project includes preparation of construction plans for all three aspects of this sewer collection system. In particular, the sewer pump station project includes a gravity flow chamber, a dual wet well system, submersible grinder pumps, an overhead bridge crane, a scrubber system, and a channel monster.

Palm Tree Area Stimulus Package Sewers

Project Engineer
Lake Havasu City | Lake Havasu City, AZ

Provided design review and quality control services for an American Recovery and Reinvestment Act (ARRA) of 2009 ARRA funded gravity sewer collection network connecting approximately 550 properties to the sanitary sewer system. Improvements including 44,000 linear feet of six-inch to 15-inch sewer with 44,000 linear feet of four-inch service laterals. Design was completed 2.5 months early in order to qualify for stimulus funding.

Cisco Area Sewers

Project Engineer
Lake Havasu City | Lake Havasu City, AZ

Provided design review and quality control services for a gravity sewer collection network connecting approximately 1,200 residences to the sanitary sewer system. Improvements included 72,000 linear feet of six-inch to eight-inch sewer with 119,000 linear feet of four-inch service laterals and several neighborhood pump stations.

Tarpon Area Sewers

Project Engineer
Lake Havasu City | Lake Havasu City, AZ

Provided design review and quality control services for a gravity sewer collection network connecting approximately 700 residences to the sanitary sewer system. Improvements included 40,000 linear feet of six-inch to eight-inch sewer with 61,000 linear feet of four-inch service laterals.

Litchfield / Grand Relief Sewer Design

Project Engineer
City of Surprise | Surprise, AZ

Provided technical oversight and QA reviews for the design of approximately 2,300 feet of 12-inch sewer within the City of Surprise. The project included alternative alignment studies, flow calculations, and utility coordination.

Tri-City Regional Sewer District Preliminary Engineering Report (PER) and Wastewater System Design

Project Manager
County of Gila | Gila County, AZ

Serves as Project Manager for the analysis of alternatives for building a new wastewater collection system in Gila County Arizona. This analysis considered four scenarios for providing sewer service to an existing community of approximately 6,000 residents in Rural Arizona. AMEC was contracted by the district to provide funding assistance, develop a PER in accordance with US Department of Agriculture (USDA)-RUS Bulletin 1780-3, provide outreach support, and design a replacement wastewater collection system. Design includes replacement of approximately 140,000 linear feet of sewer, upgrades to existing wastewater treatment facilities, and design of several lift stations. This project also includes coordination with the state engineer, ADEQ, Gila County, local utilities, and various other stake holders.

PER for Wastewater Collection System

Engineer-of-Record
City of Rio Hondo | Rio Hondo, TX

Serves as Engineer-of-Record for preparation of a wastewater collection system PER for the City of Rio Hondo, TX under contract with the Border Environment Cooperation Commission (BECC). The proposed upgrades consist of constructing new wastewater infrastructure to serve properties currently discharging to septic tanks and cesspools. This project includes analysis of both collection and treatment alternatives available to the community. The PER includes collection of background data, calculating population projections, evaluating alternatives for the project, identifying a recommended alternative, and preparing a cost estimate.

Miami PER and Wastewater System Replacement

Project Manager
City of Miami | Miami, AZ

Served as Project Manager for the upgrades to the Town of Miami's existing wastewater collection system. The Town's existing system dates back to the 1920's and is in very poor condition. AMEC was contracted to provide funding assistance, develop a PER in accordance with USDA-RUS Bulletin 1780-3, provide outreach support, and design a replacement wastewater collection system for this mining community of approximately 2,000 residents. Design includes replacement of nearly 80,000 linear feet of sewer, replacement of an existing grit separator, a new septage receiving station, and upgrades to the Town's existing lift station.

Tintown PER and Wastewater System Expansion

Project Manager
City of Bisbee | Bisbee, AZ

Served as Project Manager for the design of a new sewer system to serve approximately 73 residents in this early 1900's mining community within Bisbee Arizona. The existing residents discharge their wastewater to cesspools or septic tanks. Due to rocky terrain, AMEC is considering various alternatives for final design. AMEC will be preparing a new PER for the project. The original PER was funded by the BECC and the construction will be funded through a USDA grant. The design includes preparing plans and specifications compliant with BECC, USDA, Environmental Protection Agency (EPA), the City of Bisbee, and ADEQ. The Rural Water Association of Arizona is also providing technical assistance for the project.

PER for Wastewater Collection Pipeline

Engineer-of-Record
City of Holtville | Holtville, CA

Served as Engineer-Of-Record for preparation of a wastewater collection system PER for the City of Holtville, under contract with the BECC. The PER was developed in accordance USDA Rural Utilities Services Bulletin 1780-3. The proposed upgrades consist of replacing two four-inch-diameter pipes, each 600 feet long, with eight-inch-diameter pipes and associated manholes and household connections. The work included collection of background data, calculating population projections, evaluating alternatives for the project, identifying a recommended alternative, and preparing a cost estimate.

Chaot #2 Reservoir Inlet Manifold and Tank Mixing Conceptual Design

Designer
Guam Waterworks Authority | Guam

Provided oversight and QA review for this project in which GHD developed conceptual design options for the Chaot No. 2 Reservoir inlet header. The Guam Waterworks Authority replaced a single 1.0 mg tank with two 0.5 mg pre-stressed concrete water reservoirs. This study assessed different technologies that could be used to enhance reservoir flow mixing in order to mitigate taste concerns, potable quality (disinfection), and trihalomethane formation.

Cave Creek Water Treatment Plant 1 mgd Expansion and Upgrades

Project Manager
Town of Cave Creek | Cave Creek, AZ

Served as Project Manager expansion of the Cave Creek Water Treatment Plant with a Mircrofloc Trident TR-420A 1-mgd treatment unit. The facility treats water from Central Arizona Project and groundwater sources. The project included design of piping, pumps, appurtenances, and granular activated carbon filtration units to treat disinfection by-products for a 3 mgd water treatment plant. Additional upgrades included the design of an arsenic removal system, an onsite chlorination facility, and online Total Organic Carbon (TOC) analyzer.

Chaparral Water Treatment Plant Screen Replacement

Project Director
City of Scottsdale | Scottsdale, AZ | 2013

Served as Project Director for the design of two rotating fine screens to serve the City of Scottsdale Chaparral Water Treatment Plant. The screens are anticipated to remove DBP precursors and will increase influent flow capacity to 41 mgd. The screens will provide improved screening with 4 mm openings that will reduce the incoming organic load on the plant. The design also included 54-inch plug valves and piping improvements.

EPCOR Water Plant DBP Mitigation Improvements

Engineering Director
EPCOR | Maricopa County, AZ

As the Engineering Director for Arizona's largest private water utility, was involved in the mitigation of DBP issues within several water system in Maricopa County. His involvement included studies, design and post design oversight and review. These projects focused on reducing Total Trihalomethanes (TTHM) concentrations at five storage facilities. Average summer TTHM concentrations at these facilities ranged from 118 to 76 ppb. After analysis at these facilities, a program for improvements was established. The improvements consisted innovative approaches to spray aeration and surface aeration at the reservoirs. These simple and low-cost improvements allowed the company to operate well below the TTHM limits established in the Stage 2 disinfectants and disinfection byproducts rule (80 ppb).

Chino I Desalter Expansion

Project Manager
City of Chino Hills | Chino Hills CA

This project included providing engineering services to the Chino Basin Desalter Authority for the Chino I Desalter Expansion and Chino II Desalter projects. Services included design of a new desalter facility; expansion and upgrade of an existing desalter facility; design of groundwater wells; and design of water distribution facilities, including pump stations and pipelines. The new and expanded desalters, which include the Chino I Desalter and the Chino II Desalter, will remove nitrate and salts from the degraded groundwater basin and provide potable water to cities and agencies in the southwesterly region of the Inland Empire, including Jurupa Community Services District, City of Chino, City of Chino Hills, City of Ontario, Santa Ana River Water Company, and the City of Norco.

Live Oak Arsenic Treatment Design

Technical Lead, Quality Assurance Reviewer
City of Live Oak | Live Oak, CA | 2007

Provided technical oversight and QA reviews for this project. The project included retrofitting four facilities with ATEC Systems filters for arsenic removal. Associated improvements included drying beds, chlorination systems, reclaim tanks, chemical injection, and site piping upgrades.

PER for Water Distribution System Expansion

Engineer-of-Record
City of Holtville | Holtville, CA

Served as Engineer-of-Record for preparation of a water distribution expansion PER for the City of Holtville, under contract with the BECC. Proposed upgrades consisted of providing water distribution infrastructure to serve approximately 205 households that currently haul water or use untreated surface water from the Imperial Irrigation District canal network. The work included collection of background data, calculating population projections, evaluating alternatives for the project, identifying a recommended alternative, and preparing a cost estimate.

Thomas Vent Shaft Upgrades

Quality Control
San Francisco Public Utilities Commission | San Francisco, CA

Provided quality control and client management for this project, which involved replacement of a sampling pump and discharge piping. Methane gas had been detected in the sampling building and a room pressurization system and electrical upgrades are also included in the upgrade design. The San Francisco Public Utilities Commission operates this sampling facility located about 20 miles southwest of the City of Tracy. The sampling station collects chlorine readings on a 120-inch pipeline that is 330 feet below grade.

Miami Grit Separator Design

Project Manager
Town of Miami | Miami, AZ | 2010

Served as Project Manager for the design of a mechanical bar screen and Vortex Grit Removal system with 2.5 mgd capacity. The system will tie into the plants existing influent line and protect downstream treatment basins from accumulation of grit. The Town of Miami produces an unusually high amount of grit due to the poor condition of their collection system pipelines.

Buckeye Parkway Center Arsenic Treatment Plant

Program Manager
City of Buckeye | Buckeye, AZ | 2008

Serves as Program Manager for the design for a 5 mgd arsenic treatment facility. The arsenic treatment system uses an oxidation/filtration process with Pure Flow filters. The system was designed to reclaim up to 99% of the backwash water. The project also included site piping, three booster stations (reclaim booster pumps, backwash booster pumps, re-circulation booster pumps), two reclaim holding tanks, and a sludge holding tank.

Storage Basin Design for City of Surprise SPA1 Water Reclamation Facility Expansion

Project Manager
City of Surprise | Surprise, AZ | 2006

Served as Project Manager for this project that included plans for three equalization basins that provide flexibility to the plant's effluent recharge facilities. Construction plans include grading and cut and fill quantities. The finished basins span several acres.

Lake Pleasant 5000 208 Plan Amendment

Quality Assurance / Quality Control (QA/QC)
City of Buckeye | Buckeye, AZ | 2005

Provided technical oversight and QA/QC review of a 208 amendment for an 8 mgd water reclamation facility. This amendment included master planning of the wastewater treatment plant over a 20-year horizon, coordination with surrounding wastewater agencies, and presentations at regional and statewide committees.

Sundance Arsenic Treatment Facility

Technical Lead
City of Buckeye | Buckeye, AZ | 2005

Provided technical oversight for the civil design of a 10-million-gallon per day arsenic treatment facility. The arsenic treatment system uses an oxidation/filtration process. The system was designed to reclaim up to 99% of the backwash water. The project also included site piping, three booster pump stations (reclaim booster pumps, backwash booster pumps, recirculation booster pumps), two reclaim holding tanks, and a sludge holding tank.

Sundance Arsenic Treatment Alternative Study

Technical Support
City of Buckeye | Buckeye, AZ | 2004

Provided technical support for this study, which analyzed treatment alternatives for removing arsenic from groundwater in Buckeye, Arizona. This study reviewed existing and future water quality regulations, discussed prevalent treatment technologies, detailed the benefits and costs of the three most appropriate technologies, and recommended the best technology for the project. Technologies discussed included ion exchange, activated alumina, reverse osmosis, coagulation/filtration, lime softening, electrodialysis reversal, oxidation/filtration (co-precipitation), and other technologies (e.g., coagulation assisted microfiltration, granular, ferric hydroxide, proprietary adsorption media, etc.).

Other Related Areas of Interest

Certifications / Trainings

- Civil Engineer, AZ #35265, 2000; CA #60146, 1999; UT #324120-2202, 2009; TX #108034, 2009; New Mexico #22639, 2011
- Board Certified Environmental Engineer, 2013
- ADEQ Water Distribution System Operator, Grade IV #56870, 2012
- ADEQ Water Treatment Plant Operator, Grade IV #56869, 2012
- Leadership in Energy and Environmental Design (LEED) Accredited Professional (AP), 2007
- Certified Professional in Erosion and Sediment Control #2837, 2004
- ADEQ Wastewater Collection System Operator, Grade IV #43049, 2003
- ADEQ WWTP Operator, Grade IV #43048, 2003

Presentations

- Managing Arizona Department of Transportation (ADOT)'s Remote Water and Wastewater Facilities, AZ Water Conference and Exposition, Glendale, AZ, May 2013.
- Extreme Makeover: Miami Sewer Edition, American Water Works Association (AWWA) Tri-State Seminar, Primm, NV; September 2011.
- Bisbee Sewer Improvements: Stuck Between a Rock and a Hard Place, AZ Water Conference and Exposition, Glendale, AZ, May 2011.
- STORM: Public Outreach in the Desert, National Association of Flood & Stormwater Management Agencies Annual Meeting, San Diego, CA, August 2010.
- Cave Creek Water System Improvements: From Concept to Completion in Eight Months, AZ Water Conference, Glendale, AZ; April 2009.
- Cave Creek Water System Expansion: A 20-Year Journey, AWPCA Annual Conference, Mesa AZ; May 2007.
- Desert Outreach: Phoenix Area Municipalities Inform and Educate the Public about Stormwater Issues, ASFPM 28th Annual Conference, Biloxi, MS; May 2004.
- Design Flows for Wastewater System Planning, AWPCA Annual Conference, Mesa AZ; May 2004.
- Operators & Engineers Working in Harmony, AWWA Tri-State Conference, Laughlin, NV, September 2003.
- Overcoming Challenges in Establishing Regional Public Outreach Partnerships, EPA National Conference on Urban Storm Water, Chicago, IL, February 2003.
- Water System Design & Construction, ASUA Annual Conference, Laughlin, NV, February 2002.
- Water System Cleaning & Maintenance, ASUA Annual Conference, Laughlin, NV, February 2002.

Career history

2015 - present	GHD, Business Group Leader
2014 - 2015	EPCOR, Engineering Director
2012 - 2014	GHD, Office Manager
2009 - 2012	AMEC, Water and Wastewater Practice Leader
2009 - 2010	AzSCE, President
1997 - 2009	RBF Consulting, Department Manager, Senior Associate
2005 - 2007	Arizona State University, Adjunct Professor
1996 - 1997	Idaho National Engineering Laboratory, Research Fellow
1994 - 1996	Amoco Oil Company, Engineering Intern

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