CONSOLIDATED COMMISSION ON UTILITIES
Guam Power Authority | Guam Waterworks Authority
P.O. Box 2977 Hagatna, Guam 96932 | (671)649-3002 | guamccu.org

GWA RESOLUTION NO. 09-FY2021

RELATIVE TO APPROVAL OF CHANGE ORDER NO. 2 FOR THE PRESSURE ZONE REALIGNMENT AND TANK REPAIR/REPLACEMENT DESIGN PROJECT

WHEREAS, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities ("CCU") has plenary authority over financial, contractual and policy matters relative to the Guam Waterworks Authority ("GWA"); and

WHEREAS, the Guam Waterworks Authority ("GWA") is a Guam Public Corporation established and existing under the laws of Guam; and

WHEREAS, GWA's PMO Brown and Caldwell has developed a pressure zone realignment plan as part of the Water Resource Master Plan; and

WHEREAS, Resolution No. 36 – FY2018 (Exhibit A – Resolution 36-FY2018) authorized the total funding of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00) along with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10) for the design services of the Pressure Zone Realignment and Tank Repair/ Replacement project; and

WHEREAS, Resolution No. 12 – FY2020 (Exhibit B – Resolution 12-FY2020) authorized the total funding of Ninety Thousand Seven Hundred Seventy-Six Dollars and Ninety Cents ($90,776.90) plus an additional Two Hundred Fifty-Four Thousand Dollars ($254,000.00) to replenish the original contract's contingency, to bring the total authorized funding to Three Million One Hundred Thirty-Eight Thousand Seven Hundred Sixty-Seven Dollars ($3,138,767.00); and

WHEREAS, following CCU approval in Resolution No. 12-FY2020, GWA issued Change Order No. 1 to GHD; and

WHEREAS, GWA engineering has determined that due to recent problematic events in the system, additional system improvements associated with the Pressure Zone Realignment are necessary; and

WHEREAS, GWA is requesting for additional work which includes the following (Exhibit C):

(1) Task A: Nimitz Hill Water Improvements- Additional design for ACP line replacement, PSRV/meter installation with SCADA on Larson Rd., and the replacement of a temporary PRV on Rt.6; and

(2) Task B: Construction management services for Pressure Zone Realignment Construction Phase II, and;

WHEREAS, GWA and GHD has negotiated a price for the services provided in the amount of Two Hundred Ninety-Four Thousand Four Hundred Forty-Seven Dollars ($294,447.00) for the design services described above (Exhibit C— Scope of Work and Fee); and

WHEREAS, GWA management is seeking CCU approval of the fee proposal relative to Change order No. 2 in the amount of Two Hundred Ninety-Four Thousand Four Hundred Forty-Seven Dollars ($294,447.00) to fund the design and CM services; and

WHEREAS, GWA management further seeks CCU approval of the total authorized funding of the design contract with GHD., Inc. to Three Million Four Hundred Thirty-Three Thousand Two Hundred Fourteen Dollars ($3,433,214.00); and

WHEREAS, the funding sourced for the construction project will be from bond funds as detailed in the following CIP line items:

- PW 09-03: Water Distribution System Pipe Replacement and Upgrades
- PW 09-04: Pressure Zone Realignment/ Development 2005 Improvements
- PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program
- PW 09-11: Water System Reservoir 2005 Improvements
- PW 12-01: Water Audit Program and Water Loss Control Plan
- MP-PW-Pipe-12: Rehabilitation and Replacement Program

NOW BE IT THEREFORE RESOLVED, the Consolidated Commission on Utilities does hereby approve and authorize the following:

1. The recitals set forth above hereby constitute the findings of the CCU.
2. The CCU finds that the terms of the fee proposal submitted by GHD are fair and reasonable.
3. The CCU hereby authorizes the management of GWA to accept the fee proposal of Two Hundred Ninety-Four Thousand Four Hundred Forty-Seven Dollars ($294,447.00) from GHD, attached hereto as Exhibit C, and execute a Change Order.
4. The CCU hereby approves the total funding amount to Three Million Four Hundred Thirty-Three Thousand Two Hundred Fourteen Dollars ($3,433,214.00).
5. The CCU approves the funding sources from the following bond funds:
    - PW 09-03: Water Distribution System Pipe Replacement and Upgrades
    - PW 09-04: Pressure Zone Realignment/ Development 2005 Improvements
    - PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program
    - PW 09-11: Water System Reservoir 2005 Improvements
    - PW 12-01: Water Audit Program and Water Loss Control Plan
    - MP-PW-Pipe-12: Rehabilitation and Replacement Program

RESOLVED, that the Chairman certified and the Board Secretary attests to the adoption of this Resolution.

DULY AND REGULARLY ADOPTED, this 23rd day of February 2021.

Certified by:

JOSEPH T. DUENAS
Chairperson

Attested by:

MICHAEL T. LIMTIACO
Secretary

SECRETARY'S CERTIFICATE

I, Michael T. Limtiaco, Board Secretary of the Consolidated Commission on Utilities as evidenced by my signature above do hereby certify as follows:

The foregoing is a full, true and accurate copy of the resolution duly adopted at a regular meeting by the members of the Guam Consolidated Commission on Utilities, duly and legally held at a place properly noticed and advertised at which meeting a quorum was present and the members who were present voted as follows:

AYES: 5

NAYS: ø

ABSENT: ø

ABSTAIN: ø

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EXHIBIT A

CONSOLIDATED COMMISSION ON UTILITIES
Guam Power Authority | Guam Waterworks Authority
P.O. Box 2977 Hagatna, Guam 96932 | (671)649-3002 | guamccu.org

GWA RESOLUTION NO. 36–FY2018

RELATIVE TO APPROVAL OF THE DESIGN SERVICES FOR THE PRESSURE ZONE REALIGNMENT AND TANK REPAIR/REPLACEMENT CONTRACT

WHEREAS, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities ("CCU") has plenary authority over financial, contractual and policy matters relative to the Guam Waterworks Authority ("GWA"); and

WHEREAS, the Guam Waterworks Authority ("GWA") is a Guam Public Corporation established and existing under the laws of Guam; and

WHEREAS, GWA is working on critical reservoir projects under the 2011 Court Order ("CO") Paragraph 29 – Storage Tank/Reservoir Repair, Replacement, and Relocation Program; and

WHEREAS, GWA's PMO Brown and Caldwell has developed a pressure zone realignment plan as part of the Water Resource Master Plan (2017 Draft WRMP); and

WHEREAS, engineering and design services are required to integrate the improvements needed for realigning pressure zones within the distribution system, and the on-going 2011 CO storage tank/reservoir program; and

WHEREAS, GWA has advertised the Request for Proposals (RFP-03-ENG-2018) soliciting statement of qualifications from experienced and qualified engineering firms to provide tank repair/replacement/modification design, pressure zone realignment and zone metering design, and limited construction management services for the implementation of the pressure zone realignment construction; and

WHEREAS, RFP packages were picked up by twenty (20) interested parties, from which GWA received proposal submittals from five (5) firms before the RFP submittal deadline; and

WHEREAS, the GWA A-E Selection committee reviewed and evaluated the five (5) proposals (See Exhibit A – Score Summary) and generated a short list of the top 3 firms with a recommendation to award a contract to the firm GHD (See Exhibit B – GM's Determination); and

WHEREAS, GWA and GHD negotiated the price and scope of work for tank repair/replacement/modification design, the pressure zone realignment design (22 pressure zones), including zone metering, as recommended by the 2017 Draft WRMP, limited construction management services (estimated time & materials budget) for the implementation of the pressure zone realignment construction and an AWWA water audit, including three trial district metering areas (See Exhibit C – Scope of Work and Fee); and

WHEREAS, GWA management seeks approval of the estimated fee proposal amount of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00), along with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10), to bring the total authorized funding amount to a maximum of Two Million Seven Hundred Ninety-Three Thousand Nine Hundred Ninety Dollars and Ten Cents ($2,793,990.10); and

WHEREAS, funding for this project will be from the Bond Funds under the line items PW 09-04 Pressure Zone Realignment/Development 2005 Improvements, PW 09-10 Water Reservoir Internal/External Corrosion Rehabilitation Program, PW 09-11 Water System Reservoirs 2005 Improvements, and PW 12-01 Water Audit Program and Water Loss Control Plan; and

NOW BE IT THEREFORE RESOLVED, the Consolidated Commission on Utilities does hereby approve the following:

1. The recitals set forth above hereby constitute the findings of the CCU.

2. The CCU finds that the terms of the fee proposal submitted by GHD are fair and reasonable.
3. The CCU hereby authorizes the management to accept the fee proposal from GHD (Exhibit C) inclusive of estimated time and material budget for limited CM services, which is also incorporated into this Resolution in its entirety.
4. The CCU hereby authorizes the management of GWA to enter into a contract with GHD, in the amount of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars and Zero Cents ($2,539,991.00).
5. The CCU hereby approves the total funding amount for this project of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00), with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10), to bring the total authorized funding amount to Two Million Seven Hundred Ninety-Three Thousand Nine Hundred Ninety Dollars and Ten Cents ($2,793,990.10).
6. The CCU hereby further approved the funding source shall be the following:
   - PW 09-04: Pressure Zone Realignment/Development 2005 Improvements
   - PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program
   - PW 09-11: Water System Reservoirs 2005 Improvements
   - PW 12-01: Water Audit Program and Water Loss Control Plan

RESOLVED, that the Chairman certified and the Board Secretary attests to the adoption of this Resolution.

DULY AND REGULARLY ADOPTED, this 5th day of June 2018.

Certified by:

JOSEPH T. DUENAS
Chairperson

Attested by:

J. GEORGE BAMBA
Secretary

SECRETARY'S CERTIFICATE

I, J. George Bamba, Board Secretary of the Consolidated Commission on Utilities as evidenced by my signature above do hereby certify as follows:

The foregoing is a full, true and accurate copy of the resolution duly adopted at a regular meeting by the members of the Guam Consolidated Commission on Utilities, duly and legally held at a place properly noticed and advertised at which meeting a quorum was present and the members who were present voted as follows:

AYES: 5

NAYS: 0

ABSTENTIONS: 0

ABSENT: 0

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GUAM WATERWORKS AUTHORITY
Gloria B. Nelson Public Service Building • 688 Route 15 • Mangilao, Guam 96913

March 7, 2018

To: Thomas F. Cruz, P.E., Chief Engineer

From: Gloria P. Bensan
Chairperson, Consultant Selection Board

Subject: RFP-03-ENG-2018
Design Services for Pressure Zone Realignment and Tank Repair/Replacement
GWA Project No. W18-001-BND

The following information is intended to document the evaluation process undertaken for the referenced solicitation.

EVALUATION COMMITTEE MEMBERS	
Name	**Title**
Brett Railey, P.E.	Engineer Supervisor
Garrett Yeoh	Senior Engineer
Ryan Diaz	Junior Engineer
Vincent Pangelinan	Operations Manager

Consultant	Evaluation Score				Total	Rank
1. EMPSCO Engineering Consultants	65	63	78	66	272	5
2. TG Engineers, PC	68	80	87	81	316	4
3. GHD	96	98	97	88	379	1
4. AECOM Technical Services	91	95	98	89	373	2
5. Duenas, Camacho & Associates	82	80	96	81	339	3

Scores were evaluated based on sum of the individual scores. The recommendation of the evaluation committee is shown in the ranking above.

Please review and approve at your earliest convenience so that we may proceed with the notification letters.

GUAM WATERWORKS AUTHORITY
"Better Water. Better Lives."
Gloria B. Nelson Public Service Building
688 Route 15, Mangilao, Guam 96913

MEMORANDUM

To: Miguel C. Bordallo, General Manager

From: Thomas F. Cruz, P.E., Chief Engineer

Subject: RFP-03-ENG-2018
Design Services for Pressure Zone Realignment and Tank Repair/Replacement
GWA Project No. W18-001-BND

Date: March 7, 2018

The Selection Committee has completed all necessary actions for selecting the most qualified consultant for the referenced solicitation. All proposals were reviewed and scored according to the conditions established in the solicitation. The evaluation summary sheet is attached for your information.

The committee recommends the following top three (3) firms in order of preference for the project:

1. GHD
2. AECOM Technical Services, Inc
3. Duenas, Camacho & Associates

Concurred:

VINCENT E. GUERRERO
Supply Management Administrator

5/7/18
Date

GENERAL MANAGER'S DETERMINATION

Consultant Firm Selected:

GHD

Remarks:

MIGUEL C. BORDALLO, P.E.
General Manager

3.13.18
Date

GWA Pressure Zone Realignment and

Tank Repair/Replacement Design

Scope of Work and Fees

I. GENERAL

GHD will provide design and construction management services for the Pressure Zone Realignment and Tank Repair/Replacement Project. The design services will consist of site investigations, preparation of plans, specifications, and estimates to construct improvements recommended in the Pressure Zone Realignment and Pressure Improvement report prepared by Brown and Caldwell completed in 2017. Project design tasks include review of Brown and Caldwell's report, investigation of GWA's existing system and comparison to the report figures, Basis of Design reports, design calculations, hydraulic modelling, construction schedule estimates, topographical surveys, property research, property mapping, geotechnical reports, cultural resource inventory and evaluation of historic resources, construction documents, design drawings in Auto CAD, and construction bid support services.

The construction management tasks include onsite inspection and inspection reports, project correspondence, Quality Assurance testing, submittal review, contractor schedule review, payment request review, and progress meetings.

Reports, plans, specifications and other documents submitted to GWA shall be in a form approved by GWA.

II. PROJECT OVERVIEW

The design for the Pressure Zone Realignment and Tank Repair/Replacement Project is based on work required to accomplish the zone realignment in the above mentioned report by Brown and Caldwell, and steel tank repair or replacement as needed. The project is divided into three general tasks, the key elements and details of the scope of work are described for each:

A. Pressure Zone Realignment and Zone Metering

Appendices G and H of the Pressure Zone Realignment and Pressure Improvement report show a multitude of improvements and changes to the system over 53 zones. GHD will review and analyse the report appendices. The analysis will mainly consist of verification of existing infrastructure shown in the appendices by comparing as-built drawings and site visits. If discrepancies are found, alternative designs will be presented

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to provide the same result as intended by the report. GHD will not analyse the report for effectiveness of improvements to realign the zones.

Individual improvements that may be designed are pressure reducing valves (PRV) in vaults, master meters in vaults, in-line valves to be closed, abandonment of existing PRVs, PRV rehabs, piping connections, new waterlines, and SCADA and instrumentation systems.

GHD will sub-contract Water Systems Optimization, Inc. (WSO) to perform a water audit, analysis of losses, GWA's economic level of leakage, and implement three pilot District Metered Areas (DMA). The scope from WSO will be approved by GWA. GHD will provide only minimal project management and coordination support to WSO's scope of work and no design effort is included.

B. Hydraulic Modelling

The hydraulic modelling scope will be limited to updating the model once improvements are completed. Hydraulic modelling will also be used to determine the setting of new and replaced PRVs.

C. Tank Repair and Site Upgrades

The project includes possible repairs to ten existing steel reservoirs. The tanks are listed in the table below.

Table 2.1 Tank to Repair

Number	Tank Name	Capacity (MG)	Status	Inspected
1	Umatac Subdivision	0.5	Online	No
2	Windward Hills	1.0	Online	No
3	Umatac #1	0.2	Online	No
4	Kaiser	2.5	Online	No
5	Pigua	0.5	Online	No
6	Agat #1	1.0	Online	No
7	Malojloj	1.0	Online	No
8	Upper Nimitz	0.01	Online	Yes
9	Lower Nimitz	0.025	Offline	Yes
10	Agat #2	0.5	Online	Yes

GHD will provide construction management services for the repair of the existing steel tanks listed in Table 2.1. GWA will determine which tanks are to be repaired or

replaced. The fees for construction management services will be awarded through change orders to the contract as needed.

Tank site upgrades may include cathodic protection systems, instrumentation systems, new vaults, altitude valves, meters, piping, and a control building. The needs of each site will be determined by GWA.

III. DESIGN PHASE TASKS

A. Project Controls:

These services shall be provided to insure the project is efficiently managed and sufficient data is collected to provide a thorough design.

The project controls for each site or improvement shall consist of:

1. Analysis of the existing site conditions and on-site inspection – GHD shall visit each site to determine existing conditions and system configurations including
    a. Existing site conditions and facilities
    b. Existing site operation
    c. Proposed site improvements
    d. Preliminary site layout
    e. Research existing Right-of-Way
    f. Demolition requirements
    g. Minor grading requirements
    h. Piping and valving requirements
    i. Operational requirements
    j. Electrical power supply
    k. Construction sequencing
    l. Future expandability as needed
2. Survey Services – GHD will contract with a subconsultant to provide surveying services at each site as listed in the fee proposal, consisting of property boundary or Right-of-way (ROW), topographic field survey, and preparation of topographical mapping. These services include preparation of topographical and boundary/ROW mapping of the improvement or tank site including existing facilities above ground within the project area and adjacent sites which may be impacted. The GHD team will make all necessary research for determination of land ownership.

B. Design:

1. GHD will prepare construction drawings, specifications, cost estimates, supporting design calculations, and other documents necessary for project construction.

a. The design plans will include necessary piping, valving, fittings, and appurtenances to connect to the existing water system. The plan will also include necessary erosion control measures such as erosion control seeding, silt fencing, protection of stockpiled materials, and other necessary measures to mitigate the impact of erosion and sedimentation.
b. GHD will prepare and submit the following:
    - Multidiscipline plans to the 30% (preliminary design), 60%, 90%, and 100% completion levels.
    - Specifications at 60%, 90%, and 100% completion levels, which will include front end documents and technical specifications applicable to the indicated completion levels.
    - Construction cost estimate update at 60% completion level. This estimate will be a Class 3 estimate in accordance with the AACE International Cost Estimate Classification System. All costs will be in current dollars and escalated to the estimated midpoint of construction.
    - Final construction cost estimate based on quantity takeoffs and the requirements of the 100% design plans and specifications. This estimate will be a Class 2 estimate in accordance with the AACE International Cost Estimate Classification System. All costs will be in current dollars and escalated to the estimated midpoint of construction.
    - GHD shall coordinate with relevant agencies such as Guam Environmental Protection Agency, Department of Public Works, and other relevant agencies at the 60%, and 100% submittals. This includes submitting design documents (11x17 plans and specifications at both phases) and maintaining communication throughout the duration of the project and incorporating any relevant regulation requirements in the design.

Task B Deliverables: Deliverables to GWA will be provided in accordance with the following:

1. 30% phase
    a. 5 hard copies of the design development documents – if requested
    b. Digital copy of the design development documents
2. 60% phase
    a. 5 hard copies of the 60% design documents (plan submittal shall consist of 3 sets of 11"x17" sized drawings if requested)
    b. Digital copy of the 60% design documents
3. 90% phase
    a. 5 hard copies of the 90% design documents (plan submittal shall consist of 3 sets of 11"x17" sized drawings if requested)

b. Digital copy of the 90% design documents

4. Final phase
    a. 5 hard copies of the final design documents (plan submittal shall consist of 2 sets of 36"x24" sized drawings and 3 sets of 11"x17" sized drawings)
    b. Digital copy of the final design documents

IV. CONSTRUCTION PHASE TASKS

A. Construction Bid Support Services:

1. Pre-Bid Conference (4 total) - GHD shall assist GWA with the meeting and provide meeting minutes for the pre-bid conference. The pre-bid conference shall be arranged to inform prospective bidders of the overview of the project. GHD will be present to respond to technical questions involving the design and specifications and will provide formal responses within five working days of the meeting.
2. Request For Information – GHD will assist GWA with preparing answers to questions regarding the bid packages during the bidding phase.
3. Bid Addenda – GHD will provide addenda to the plans, specifications and contract documents as needed during the bidding phase.
4. Bid Evaluation (4 total) – Upon receipt of bids GHD will review the bid packages and provide GWA with a recommendation and/or concurrence on the proposed selected contractor. This will include a bid analysis, review of bid proposal prices, and conformance with contract requirements and the Guam Procurement Code. GHD will prepare a recommendation of award letter.

B. Construction Management Services:

GHD will assume a budget for time and material construction management services for the Pressure Zone Realignment and Zone Metering improvements. The budget assumes a part-time construction manager for four (4) different construction packages with a four month construction duration for each. If the assumed budget is depleted and additional construction management services are required, then GHD will negotiate a change order to the contract with GWA.

Construction Management Services shall consist of:

1. Implementation and maintenance of project controls
2. Conduct and prepare meeting minutes for
    a. Pre-construction conference
    b. Weekly or bi-weekly progress meetings
    c. As-built drawing review meetings
    d. Other meetings as required
3. Project correspondence including

a. Daily construction reports
b. Material testing logs
c. Progress photos

4. Submittal and shop drawing review including Contractor project schedules
5. Payment requests review and processing including payroll reports
6. Track and process Requests for Information
7. General Compliance Monitoring for
    a. Labor laws
    b. Permit compliance
    c. insurance
8. Claims and disputes
    a. Claim records
    b. Review and interpret claims
    c. Change order review, negotiation and log
    d. Prepare design changes
9. Maintenance of project records and document management
10. Quality Assurance testing and inspection
11. Construction observation, part-time inspection and quality control monitoring
12. Provide special inspections as required
13. Project Closeout
    a. Inspections
    b. Punch list development
    c. Coordinate training
    d. Review closeout submittals
14. Final CM report

V. PROJECT PLANNING AND MANAGEMENT

The GHD team shall arrange for a bi-weekly design meeting with team members and GWA to discuss design issues, progress of work, and coordination. GHD shall prepare meeting minutes for all design progress meetings. The meeting minutes shall include action items from week to week. Separate hydraulic analysis team meetings will be held to streamline this time sensitive work.

GHD shall maintain an electronic project record which will include all project correspondence, reports, meeting minutes, deliverables, and other items required to document the project. GHD will communicate and coordinate with all stakeholders during the design, bid and construction phases.

CLARIFICATIONS AND ASSUMPTIONS:

1. The fee assumes items will be included in the design that may not be needed based on the analysis of the appendices of the report by Brown and Caldwell. If any item is

not required, based on the analysis report, then the individual fee can be removed from the scope.

2. Assumed individual improvements for the project are listed on the attached Scope of Work Table. If design is required for other improvement, GHD will negotiate a change order to the contract.
3. GHD assumed Project Planning and Management will last for two years (104 weeks). If the project is extended past that time, additional fees will be negotiated with GWA.
4. Pressure Zone Realignment and Zone Metering:
    a. Improvements to the PRV/meter and existing tank sites will include only minimal grading design if required.
    b. A budget for construction management has been assumed. The budget was based on an estimate of one part-time inspector for four separate packages with four-month construction durations. The budget will be invoiced as time and material.
    c. Property investigation, appraisals, and boundary surveys are excluded.
    d. Design of remote control of three PRV sites via the SCADA system will be provided as trial for GWA.
    e. Refurbishment of existing PRV sites will only include the replacement of pipe, fittings and PRVs. Meters, electrical, SCADA and new vaults are excluded.
5. Hydraulic Modelling:
    a. Effort for hydraulic modelling has been assumed per improvement site as needed to verify the improvement is needed per the model prior to design and to update the model after construction. Hydraulic modelling will be used to determine the setting of the new PRVs in the project. No extensive modelling of the system or updating is included.
6. Tank Repair and Site Upgrades:
    a. The review of tank repair plans is excluded.
    b. The project will include repair for the ten tanks listed above and in the RFP. It is assumed that all ten tanks can be repaired. If, after further inspection, it is determined by GWA that an existing tank cannot be repaired, then GHD will negotiate a change to the scope of work to design an AWWA D110 Type I pre-stressed concrete replacement reservoir.
    c. Designs for improvements to existing tank sites may include cathodic protection systems, instrumentation systems, new vaults, altitude valves, meters, piping, a control building, other necessary tank and site upgrades. The needs of each site will be determined by GWA.
    d. Construction Management Services for repair of existing steel tanks will be awarded as needed through a change order to the contract.
    e. Hazardous material testing is excluded. Testing can be added through a change order to the contract if a tank is determined to be demolished and testing is deemed necessary.

7. Data Loggers: An assumed budget of $525 per logger setup (x15), including lock and fittings. GHD will provide research of different brands and models by requesting experience from other GHD offices. There may not be any responses from the request resulting in no recommendation.
8. GHD will not prepare the construction permit applications, route the permits through the required government agencies, nor pay permit fees.
9. GHD will create four (4) separate bid packages for the pressure zone realignment. The improvements will be divided to provide four (4) packages with similar construction costs.
10. Fees are not included for GHD to revise or update bid packages that have expired due to a delay in advertising them for bid. GWA agrees to negotiate with GHD for change orders for additional work that may include such services as restamping plans and specifications, verifying design based on a change in the adopted building code or design standards, and preprinting of the bid packages.
11. GWA agrees to negotiate with GHD for change orders for additional design phase services due to additional work or any other reason not due to the negligent acts of GHD.

VI. FEE SCHEDULE

TASK	DESCRIPTION	COST
A	**Project Planning/Management**	
A1	Design Scope/Fee Development	$11,106
A2	Project Design Meetings (52, every two weeks)	$31,214
A3	Hydraulic Analysis Team Meetings (24)	$13,032
A4	Planning and Design Team Management	$54,300
A5	Project Communication/File Management	$14,118
A6	Subconsultant Management	$12,660
A7	Review of Pressure Zone Realignment Report	$5,430
A8	Project Administration/Invoicing	$14,832
A9	District Metered Areas (DMA) Study	$206,396
A10	Data Loggers (15)	$9,749
	SUBTOTAL	**$372,837**
	EXPENSES SUBTOTAL	**$7,068**
	PLANNING/MANAGEMENT & EXPENSES SUBTOTAL	**$379,905**
B	**Pressure Zone Realignment Tasks**	
B1.0	**Project Controls**	
B1.1	Plan Set Preparation (8)	$11,456
B1.2	Specifications General (8)	$19,794
B1.3	GEPA Review and Responses (8)	$4,074
B1.4	Design Review Meeting (8)	$3,076
	SUBTOTAL	$38,400
B2.0	**Pressure Zone Improvements Design**	

G-4	Yigo North	$84,317
G-5	Yigo South	$9,052
G-7	Astumbo	$233,432
G-8	Route 15	$16,991
G-9	Barrigada	$158,416
G-10	Barrigada Subzone	$153,288
G-12	Hyundai	$10,290
G-13	Hyundai Subzone	$18,338
G-14	Mangilao North	$103,375
G-15	Mangilao Central	$50,758
G-16	Kaiser	$31,262
G-17	Harmon Industrial	$62,365
G-18	Tumon/Tamuning/Hagatna North	$68,231
G-19	Tumon/Tamuning/Hagatna Central	$13,415
G-21	Tiyan	$87,253
G-22	Mangilao	$112,016
G-23	Ordot/Sinajana	$171,192
G-25	Pago Bay	$34,435
G-31	Santa Rita	$10,855
G-32	Santa Ana Lower	$45,043
G-33	Santa Ana Upper	$13,403
G-52	Chalan Palauan	$17,726
B2.1	Tank Site Upgrades (assumed budget)	$160,000
	SUBTOTAL	**$1,665,453**
B3.0	**Construction Bid Support Services**	
B3.1	Prebid Conference and Meeting Minutes (8)	$2,896
B3.2	RFI Responses (assume 10 at 2 hr each, per package)	$14,480
B3.3	Bid Addenda	$4,992
B3.4	Bid analysis and recommendation (8)	$10,612
	SUBTOTAL	**$32,980**
B4.0	**Construction Management Services**	
B4.1	Assumed T&M Budget (4 packages, part-time CM, 4 mo. Constr. Ea)	$300,000
	SUBTOTAL	**$300,000**
	PRESSURE ZONE DESIGN SERVICES SUBTOTAL	**$2,036,833**
ALL	SUBTOTAL	$2,416,738
ALL	GRT AT 5.1%	$123,254
ALL	**GRAND TOTAL**	**$2,539,991**

EXHIBIT B

CONSOLIDATED COMMISSION ON UTILITIES
Guam Power Authority | Guam Waterworks Authority
P.O. Box 2977 Hagatna, Guam 96932 | (671)649-3002 | guamccu.org

GWA RESOLUTION NO. 12-FY2020

RELATIVE TO APPROVAL OF CHANGE ORDER NO. 1 FOR THE PRESSURE ZONE REALIGNMENT AND TANK REPAIR/REPLACEMENT DESIGN PROJECT

WHEREAS, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities ("CCU") has plenary authority over financial, contractual and policy matters relative to the Guam Waterworks Authority ("GWA"); and

WHEREAS, the Guam Waterworks Authority ("GWA") is a Guam Public Corporation established and existing under the laws of Guam; and

WHEREAS, GWA's PMO Brown and Caldwell has developed a pressure zone realignment plan as part of the Water Resources Master Plan; and

WHEREAS, CCU Resolution No. 36-FY2018 (Exhibit A-Resolution 36-FY2018) authorized a design contract with GHD with total funding of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00) along with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10) for the design services of the Pressure Zone Realignment and Tank Repair/Replacement project; and

WHEREAS, GWA seeks to continue the design services of GHD and their subconsultant, Water Systems Optimization, Inc. (WSO) for the further development of an island-wide water loss control program and construction plans for program execution; and

WHEREAS, GWA and GHD have negotiated a price of Three Hundred Seventy-Three Thousand Six Hundred Seventy Dollars ($373,670.00) for the design services described above (Exhibit B-Scope of Work and Fee); and

WHEREAS, GWA management is requesting authorization to increase the funding amount for the GHD contract by Ninety Thousand Seven Hundred Seventy Six Dollars and Ninety Cents ($90,776.90) plus an additional Two Hundred Fifty Four Thousand Dollars ($254,000.00) to replenish the original contract's contingency, bringing the total authorized funding to Three Million One Hundred Thirty-Eight Thousand Seven Hundred Sixty-Seven Dollars ($3,138,767.00); and

WHEREAS, the funding source for the construction project will be from bond funds as detailed in the following CIP line items:

- PW 09-04: Pressure Zone Realignment/ Development 2005 Improvements
- PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program
- PW 09-11: Water System Reservoir 2005 Improvements
- PW 12-01: Water Audit Program and Water Loss Control Plan

NOW BE IT THEREFORE RESOLVED, the Consolidated Commission on Utilities does hereby approve and authorize the following:

1. The recitals set forth above hereby constitute the findings of the CCU.
2. The CCU finds that the terms of the fee proposal submitted by GHD are fair and reasonable.
3. The CCU hereby authorizes the management of GWA to accept the fee proposal of Three Hundred Seventy-Three Thousand Six Hundred Seventy Dollars ($373,670.00) from GHD, attached hereto as Exhibit B, and execute a Change Order.
4. The CCU hereby approves the total funding amount to Three Million One Hundred Thirty-Eight Thousand Seven Hundred Sixty-Seven Dollars ($3,138,767.00).
5. The CCU approves the funding sources from the following bond funds:
    - PW 09-04: Pressure Zone Realignment/ Development 2005 Improvements
    - PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program

- PW 09-11: Water System Reservoir 2005 Improvements
- PW 12-01: Water Audit Program and Water Loss Control Plan

RESOLVED, that the Chairman certified and the Board Secretary attests to the adoption of this Resolution.

DULY AND REGULARLY ADOPTED, this 28th day of January 2020.

Certified by:

JOSEPH T. DUENAS
Chairperson

Attested by:

MICHAEL T. LIMTIACO
Secretary

SECRETARY'S CERTIFICATE

I, Michael T. Limtiaco, Board Secretary of the Consolidated Commission on Utilities as evidenced by my signature above do hereby certify as follows:

The foregoing is a full, true and accurate copy of the resolution duly adopted at a regular meeting by the members of the Guam Consolidated Commission on Utilities, duly and legally held at a place properly noticed and advertised at which meeting a quorum was present and the members who were present voted as follows:

AYES: 5

NAYS: 0

ABSTENTIONS: 0

ABSENT: 0

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EXHIBIT A

CONSOLIDATED COMMISSION ON UTILITIES
Guam Power Authority | Guam Waterworks Authority
P.O. Box 2977 Hagatna, Guam 96932 | (671)649-3002 | guamccu.org

GWA RESOLUTION NO. 36–FY2018

RELATIVE TO APPROVAL OF THE DESIGN SERVICES FOR THE PRESSURE ZONE REALIGNMENT AND TANK REPAIR/REPLACEMENT CONTRACT

WHEREAS, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities ("CCU") has plenary authority over financial, contractual and policy matters relative to the Guam Waterworks Authority ("GWA"); and

WHEREAS, the Guam Waterworks Authority ("GWA") is a Guam Public Corporation established and existing under the laws of Guam; and

WHEREAS, GWA is working on critical reservoir projects under the 2011 Court Order ("CO") Paragraph 29 – Storage Tank/Reservoir Repair, Replacement, and Relocation Program; and

WHEREAS, GWA's PMO Brown and Caldwell has developed a pressure zone realignment plan as part of the Water Resource Master Plan (2017 Draft WRMP); and

WHEREAS, engineering and design services are required to integrate the improvements needed for realigning pressure zones within the distribution system, and the on-going 2011 CO storage tank/reservoir program; and

WHEREAS, GWA has advertised the Request for Proposals (RFP-03-ENG-2018) soliciting statement of qualifications from experienced and qualified engineering firms to provide tank repair/replacement/modification design, pressure zone realignment and zone metering design, and limited construction management services for the implementation of the pressure zone realignment construction; and

EXHIBIT A

WHEREAS, RFP packages were picked up by twenty (20) interested parties, from which GWA received proposal submittals from five (5) firms before the RFP submittal deadline; and

WHEREAS, the GWA A-E Selection committee reviewed and evaluated the five (5) proposals (See Exhibit A – Score Summary) and generated a short list of the top 3 firms with a recommendation to award a contract to the firm GHD (See Exhibit B – GM's Determination); and

WHEREAS, GWA and GHD negotiated the price and scope of work for tank repair/replacement/modification design, the pressure zone realignment design (22 pressure zones), including zone metering, as recommended by the 2017 Draft WRMP, limited construction management services (estimated time & materials budget) for the implementation of the pressure zone realignment construction and an AWWA water audit, including three trial district metering areas (See Exhibit C – Scope of Work and Fee); and

WHEREAS, GWA management seeks approval of the estimated fee proposal amount of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00), along with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10), to bring the total authorized funding amount to a maximum of Two Million Seven Hundred Ninety-Three Thousand Nine Hundred Ninety Dollars and Ten Cents ($2,793,990.10); and

WHEREAS, funding for this project will be from the Bond Funds under the line items PW 09-04 Pressure Zone Realignment/Development 2005 Improvements, PW 09-10 Water Reservoir Internal/External Corrosion Rehabilitation Program, PW 09-11 Water System Reservoirs 2005 Improvements, and PW 12-01 Water Audit Program and Water Loss Control Plan; and

NOW BE IT THEREFORE RESOLVED, the Consolidated Commission on Utilities does hereby approve the following:

1. The recitals set forth above hereby constitute the findings of the CCU.

EXHIBIT A

2. The CCU finds that the terms of the fee proposal submitted by GHD are fair and reasonable.
3. The CCU hereby authorizes the management to accept the fee proposal from GHD (Exhibit C) inclusive of estimated time and material budget for limited CM services, which is also incorporated into this Resolution in its entirety.
4. The CCU hereby authorizes the management of GWA to enter into a contract with GHD, in the amount of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars and Zero Cents ($2,539,991.00).
5. The CCU hereby approves the total funding amount for this project of Two Million Five Hundred Thirty-Nine Thousand Nine Hundred Ninety-One Dollars ($2,539,991.00), with a ten percent (10%) contingency of Two Hundred Fifty-Three Thousand Nine Hundred Ninety-Nine Dollars and Ten Cents ($253,999.10), to bring the total authorized funding amount to Two Million Seven Hundred Ninety-Three Thousand Nine Hundred Ninety Dollars and Ten Cents ($2,793,990.10).
6. The CCU hereby further approved the funding source shall be the following:
   - PW 09-04: Pressure Zone Realignment/Development 2005 Improvements
   - PW 09-10: Water Reservoir Internal/External Corrosion Rehabilitation Program
   - PW 09-11: Water System Reservoirs 2005 Improvements
   - PW 12-01: Water Audit Program and Water Loss Control Plan

RESOLVED, that the Chairman certified and the Board Secretary attests to the adoption of this Resolution.

DULY AND REGULARLY ADOPTED, this 5th day of June 2018.

Certified by:

JOSEPH T. DUENAS
Chairperson

Attested by:

J. GEORGE BAMBA
Secretary

EXHIBIT A

SECRETARY'S CERTIFICATE

I, J. George Bamba, Board Secretary of the Consolidated Commission on Utilities as evidenced by my signature above do hereby certify as follows:

The foregoing is a full, true and accurate copy of the resolution duly adopted at a regular meeting by the members of the Guam Consolidated Commission on Utilities, duly and legally held at a place properly noticed and advertised at which meeting a quorum was present and the members who were present voted as follows:

AYES: 5

NAYS: 0

ABSTENTIONS: 0

ABSENT: 0

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December 24, 2019

Mauryn McDonald, PE
Chief Engineer
Guam Waterworks Authority
Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913

Attention: Garrett Yeoh

RE: Change Proposal 02 for Design Services for GWA's Pressure Zone Realignment and Tank Repair/Replacement, GWA Project W18-001-BND
Water Loss Control Program Development

Dear Ms. McDonald:

GHD is pleased to submit this change proposal to amend our Scope of Work and Fee for the Pressure Zone Realignment and Tank Repair/Replacement (Pressure Zone Realignment) project. This scope of work defines the additional design services GHD and our subconsultant, Water Systems Optimization, Inc. (WSO), will provide for Phase 3 of the Water Loss Control Program. More specifically, the design services will include the development of a plan to implement District Metered Areas (DMA) island-wide and the construction documents to execute four sites that resulted from the DMA Conversion report prepared by WSO and delivered to GWA November 2019. The original project scope will be amended on a lump sum basis per the fees in the table below.

SCOPE OF WORK

The first step will be the Phase 3 Water Loss Control Program Development to be prepared by WSO. The detailed scope of work, dated October 2019, is attached. The plan will include identification of DMA infrastructure requirements to implement the DMAs in Task 4 of the attached scope of work. GHD will provide project oversight and coordination between the original Pressure Zone Realignment scope of work. Efforts will be coordinated with the design and construction documents of the Pressure Zone Realignment in the determination of DMAs. GHD will review the infrastructure requirements identified under Task 4 of the WSO scope of work for suitability with GWA's water system and the climate on Guam.

Secondly, GHD will prepare construction documents to execute the infrastructure requirements to convert four temporary DMAs under Phase 2 of the WSO original scope to permanent DMAs. The design will follow the recommendations in the report "DMA Conversion – Recommendations for Conversion of the

Temporary DMAs to Permanent DMAs." The four DMAs are Asan-Piti, Mataguac, Nimitz Estates, and Windward-Talafofo. These recommendations included battery-powered flow meters, data loggers and M2M data transmission that do not communicate with GWA's SCADA system. No electrical or SCADA design will be provided under this scope of work. The documents will include specifications, plans, cost estimates, and bid forms necessary for bidding and permit submittal to DPW. The documents will be integrated with construction documents for a phase of the Pressure Zone Realignment. GHD will prepare and submit the following:

- Multidiscipline plans at 30%, 60%, 90%, and Final completion levels per the requirements for Pressure Zone Realignment.
- Construction cost estimate based on the 60% and 100% design plans and specifications. These estimates will be Class 3 and 2 respectively in accordance with the AACE International Cost Estimate Classification System.

GHD shall coordinate with Guam Environmental Protection Agency and Department of Public Works at the 90% submittal. This includes submitting 11x17 plans, one meeting with each, and incorporating any relevant regulation requirements in the design.

ASSUMPTIONS AND EXCEPTIONS

- This change proposal only applies to the scope of work and contract amount. The terms of the original executed agreement still apply.
- The scope to prepare construction documents for the execution of the infrastructure improvements for permanent DMAs is limited to the specific sites listed above. If infrastructure requirements are needed for more sites, GHD will negotiate a fee adjustment.
- GHD's scope of work assumes that existing conditions are accurately defined by WSO and SCADA and electrical design are excluded. The fee will be renegotiated for design changes based on differing conditions from those defined by WSO.
- Property and right-of-way research and acquisition will be provided by GWA.
- Survey services are excluded. It is assumed that the existing site conditions can be prepared based on field hand measurements, utility locations from aboveground utility appurtenances, and as-built drawings.
- Construction Bid Support Services are excluded.
- Construction Management Services are excluded.

The fee will be adjusted accordingly if designs are needed at less than 30 sites or less than four different sets of contract documents are prepared for bidding. The fees for specifications and bid plans apply if the documents are combined into a set with improvements from the original Pressure Zone Realignment scope of work.

FEE SCHEDULE FOR ADDITIONAL DESIGN SERVICES

TASKS	TOTALS
Original Contract Amount	$2,511,097
WSO fee and GHD markup	$287,500

GHD Project Management and Coordination	$14,800
GHD Construction Documents • 4 sites at $11,000 each • Enclosure Detailing $4,000 • Specifications Additions $2,500 • Cost Estimates $2,400	$52,900
Subtotal Cost	**$355,200**
Guam GRT (at 5.2%)	$18,470
TOTAL CHANGE PROPOSAL COST	**$373,670**
AMENDED CONTRACT AMOUNT	**$2,884,767**

Work that exceeds the scope of this proposal will be brought to your attention for review, approval and fee adjustment. Work performed will be billed monthly based on the estimated percent complete. We stand ready to provide the professional services necessary to assist GWA in this endeavor.

Sincerely,

Aaron Sutton, PE, ENV SP
Project Manager

Attachments: WSO Phase 3 Water Loss Control Program Development Proposal, October, 2019

Cc: file

GUAM WATERWORKS AUTHORITY

Phase 3

Water Loss Control Program Development

WATER SYSTEMS OPTIMIZATION, INC.

WSO

PROPOSAL SUBMISSION

OCTOBER, 2019

ELECTRONICALLY SUBMITTED

COVER LETTER

October 18, 2019

TO: GHD - Guam
Attn: Mr. Aaron Sutton, P. E.
GHD Guam Office Manager

FROM: Water Systems Optimization, Inc.
131 Kissling Street
San Francisco, CA 94103
Tel: 415-533-0419

Dear Mr. Sutton,

After successful completion of Phase 1 and 2 of the Guam Waterworks Authority (GWA) Water Loss Control Program we are pleased to submit this scope for Phase 3 as requested during recent meetings with GWA stakeholders.

Phases 1 and 2 have confirmed that there is a strong case for substantial cost recovery through the implementation of a comprehensive water loss reduction project in GWAs distribution network.

In Phase 3, WSO will develop a water loss control program for GWA based on the island-wide implementation of District Metered Areas, an approach proven successful during Phase 2. The aim is to provide a long-term, sustainable and holistic approach to monitoring and managing water losses within the GWA water supply and distribution network.

Our project team wholeheartedly believes that we are uniquely positioned to provide the best service to GWA and its customers. Water Systems Optimization (WSO) respectfully submits the enclosed scope with the intention that all of the required information is supplied. WSO will happily provide any further clarification if needed.

If you have any questions, please do not hesitate to contact me at (786) 877-5752 or by email at reinhard.sturm@wsoglobal.com.

Sincerely,

Reinhard Sturm

CEO/President – WSO

Contents

TABLE OF TABLES

1 PHASE 3: WATER LOSS CONTROL PROGRAM DEVELOPMENT

Project Approach & Understanding

During the Phase 2 Pilot Project, the direct measurement of water losses in three pilot temporary District Metered Areas (DMAs) supported and confirmed the results from the Phase 1 top-down water audit - that physical water loss from leaking pipes is the major component of water loss for GWA.

In Phase 3 WSO will develop a water loss control program for GWA based on the island-wide implementation of DMAs. The aim is to provide a long-term, sustainable and holistic approach to monitoring and managing water losses within the GWA water supply and distribution network.

DMAs allow the direct measurement of water losses within the water network and can be used to set targets for water loss reduction at the DMA, supply zone and system-wide level. Within each DMA, leak detection and repair will be carried out to reduce water losses from detectable leaks and, where necessary, pressure within the DMA will be managed downwards to further reduce losses from background leaks. A DMA monitoring system will provide for the automated calculation of monthly water loss volume within each DMA. This allows DMAs to be ranked in priority order according to their volume of water loss. The long-term aim will be to reduce the water loss volume in each DMA to the optimum economic level and to focus water loss control activity in those DMAs where water loss increases above the economic level. This approach will ensure that GWA reduces the current markedly high water-loss level and has in place a system to manage future water loss levels at the most economic level.

The requested services include the development of a DMA implementation program that takes into account the ongoing pressure zone realignment program and other relevant CIP and operational programs.

WSO proposes the following steps to develop a DMA-based water loss water management program for GWA.

1. Review existing zone realignment and CIP plans and hydraulic models.
2. Identify potential DMAs to provide maximum coverage of the water supply and distribution network.
3. Identify the GWA customers inside each potential DMA to assess for DMA size and water demand.
4. Identify DMA infrastructure requirements and costs including requirements for DMA meter points, chambers, boundary valves, telemetry/SCADA and pressure management.
5. Produce a prioritized ranking of potential DMAs by ease / least cost implementation.
6. Develop a phased DMA implementation plan (3 to 5-year plan).
7. Produce draft scopes for the various project implementation elements (design, construction and management).

2 PHASE 3: SCOPE OF WORK

Task 1: Review of Existing Plans and Models

Task 1A: Zone Realignment Plan and Phasing

Review Zone Realignment Plan

WSO will review the ongoing zone realignment plan to understand the current and proposed network configuration, as well as the associated realignment tasks (new PRVs etc.). WSO will also review the phasing of the zone realignment work in order to understand the sequence in which the zones are being realigned. This will feed into the later task where the DMA Implementation Plan is developed.

Task 1A outcomes:

- *Understanding of the current and proposed network configuration*
- *Understanding of the order in which the pressure zones are being realigned*

Task 1B: Hydraulic Model

Review Hydraulic Model Output

WSO will review the current hydraulic model of the GWA network, including the future scenarios that cover the pressure zone realignment. This will improve the understanding of how the current network configuration is performing and what effects the proposed pressure zone realignment work will have. The model can also be used to test the proposed DMAs that are identified in Task 2.

Task 1B outcomes:

- *Utilization of the hydraulic model to assist in understanding the performance of the current network configuration*
- *Utilization of the hydraulic model to assist in understanding the performance improvements being brought about by the proposed pressure zone realignment work*
- *Prepare for utilization of the hydraulic model to test potential DMAs*

Task 1C: GIS

Review current GIS records

Obtain latest GIS records for the pipe network and customer locations for DMA design.

Task 1C outcomes:

- *Utilization of GIS records for DMA design*

Task 1D: Pressure Reducing Valve (PRV) Rehabilitation / Replacement Plans and any other relevant CIP projects

Review the PRV Rehabilitation / Replacement Plans

WSO will review GWAs plans for rehabilitation and/or replacement of PRVs and all other relevant CIP projects (pump station upgrades, new wells, etc.) to ensure these are taken into account in the DMA identification phase.

Task 1D outcomes:

- *Understanding of GWAs PRV rehabilitation / replacement plans*
- *Understanding of relevant CIP projects*

Task 2: Identification of Potential DMAs

Task 2A: Desk Study

WSO will carry out a desk study utilizing the data and understanding gained in Task 1 to identify all the potential DMAs, including the potential DMA inlet points and boundaries. Each potential DMA will be tested using the hydraulic model to ensure that it can be implemented without impacting on service levels.

Task 2A outcomes:

- *Draft list of potential DMAs with inlet points and boundaries*

Task 2B: Site Visit to Potential DMA Inlet Locations

WSO will carry out a site visit to all potential DMA inlet locations to identify the optimal DMA inlet meter point location.

Task 2B outcomes:

- *DMA Inlet meter Location Point Plans.*

Task 2C: Site Visit to Potential DMA Boundary Locations

The extent of each DMA boundary will be determined by inspection of the pressure zone details and the distribution network records. The location of any boundary valve will be identified. All boundary valves will be located and tested for operation including whether it can provide a water-tight shut when closed off and tested for operation. Should a boundary valve be found to be inoperable or passing, it will need to be replaced with a new boundary valve. Any boundary valve that cannot be located will need excavating to enable testing.

Task 2C outcomes:

- *DMA boundary valve plans, including list of valves that need to be replaced and new valves that need to be installed*

Task 2D: Site Visit all above-ground infrastructure in each potential DMA

The above-ground infrastructure (water tanks and pumping stations) in each DMA will be inspected to determine what additional measurement devices (water level, inlet and outlet flow) are required to ensure that the DMA water balance can be correctly calculated. This is particularly relevant for water tanks within a DMA where water storage increases / decreases must be recognized to correctly calculate water losses.

Task 2D outcomes:

- *Identification of additional measurement requirements at above-ground infrastructure in each DMA*

Task 2E: Non-intrusive DMA Inflow Measurement and Preliminary Water Loss Assessment

Where possible, the DMA inflow will be measured using non-intrusive techniques (logging of existing meters and/or use of clamp-on ultrasonic flow meters). This will enable a preliminary water loss assessment for the potential DMA to be carried out.

Task 2E outcomes:

- *DMA Inlet flow measurement (where possible)*
- *DMA Water Loss Assessment where inflow measurement is possible*

Task 2F: DMA Pressure Data Collection

Pressure data will be collected in each potential DMA using both normal and high-frequency data loggers to assess the pressure profile and determine the scope for pressure management in the DMA.

Task 2E outcomes:

- *DMA pressure data*
- *Identification of scope for pressure management in the DMA*

Task 2G: Zero Pressure Tests

Where possible, a Zero Pressure Test (ZPT) will be carried out in the potential DMA. This entails closing the main inlet supply valve for the zone and recording the pressure at selected locations within the zone. All boundary valves will be manually sounded during the ZPT to make sure they close tightly and are not allowing water to pass into the zone. Should the zone fail the ZPT (positive pressure remains within the zone) then extensive investigations will be needed to locate the zone breach. Additional boundary valves may be required if zone breaches are identified.

Task 2E outcomes:

- *Confirmed DMA boundary*
- *Need for additional boundary valves*

Task 3: Customer Identification per DMA

WSO will utilize the existing GWA customer billing data to identify the number of customers and the current customer demand within each potential DMA. This will be used in the assessment of DMA water losses for those DMAs where temporary inflow measurement has been possible.

Task 3 outcomes:

- *Number of customers in each potential DMA*
- *Current customer demand in each potential DMA*

Task 4: Identification of DMA Infrastructure Requirements

For each potential DMA, the infrastructure requirements needed to implement the DMA will be identified, catalogued and provisionally costed. These will include:

- Preliminary DMA meter point pipework design and costing
- Preliminary DMA meter point chamber design and costing
- DMA boundary valve locations, including preliminary design for additional vales, where necessary.
- Preliminary DMA telemetry / SCADA requirements
- Additional pressure management requirements

Task 4 outcomes:

- *Complete list of all DMA infrastructure requirements with preliminary design and costings*

Task 5: Prioritization of Proposed DMAs

WSO will produce a priority ranking of the potential DMAs by ease of implementation and capital investment needed (least cost first). This will drive the DMA Implementation Plan with the DMAs that are easiest to implement and have lowest capital cost requirement being done first.

Task 5 outcomes:

- *Prioritized list of potential DMAs ranked by ease of implementation*

Task 6: Develop DMA Implementation Plan

The prioritized list of potential DMAs will be used to develop a 3-year to 5-year DMA implementation plan. The plan will take into account the pressure zone realignment work. The plan will set out in detail the requirements for each DMA in terms of construction requirements, boundary valve operation, telemetry and SCADA requirements, and additional pressure management requirements.

Task 6 outcomes:

- *DMA implementation Plan*

Task 7: Develop Draft Scopes for Implementation Project Contracting Elements

WSO will develop draft scope of works for the Implementation Project contracting elements.

Task 7 outcomes:

- *Draft Scope for Construction Design and Specifications*
- *Draft Scope for Water Loss Control Management including DMA boundary implementation, leak detection, pressure management and ongoing monitoring of DMA water loss levels*
- *Draft Scope for Leak Repair works*

3 PROJECT MANAGEMENT AND REPORTING

In order to ensure that the project meets GWA WSD's expectations and timeline, the project team will schedule appropriate milestone meetings to discuss project findings and scheduling. In addition to the project milestone meetings, the project team will schedule individual meetings with various departments and stakeholders as necessary. Monthly progress reports will accompany the monthly invoice that WSO will prepare.

After completing all tasks, the project team will develop a final report that includes an executive summary, a description of the study process, all analyses conducted, and findings and recommendations for implementing GWA's water loss control program. Prior to submittal of the final report, WSO will prepare a draft report for GWA staff review and incorporate comments received from GWA in preparing the final report.

- *Monthly invoicing and progress update*
- *Brief program report on water loss program recommendations*
- *Slide deck for presenting water loss program*

4 PROJECT SCHEDULE AND COST

Project Schedule

WSO understands that time is of the essence for GWA, and we can guarantee that the project will be completed in the expected timeframe with all deliverables by June 30, 2020 assuming a project start date no later than January 1, 2020.

WSO will update GWA staff regularly with project findings and the status of each task underway. WSO will conduct milestone meetings to present and discuss project findings and adjust task schedules where necessary. WSO prides itself on being accessible and responsive – we will be in close communication to ensure the on-time and complete delivery of the project's objectives.

Additionally, WSO will schedule an in-person results presentation to discuss findings and recommendations.

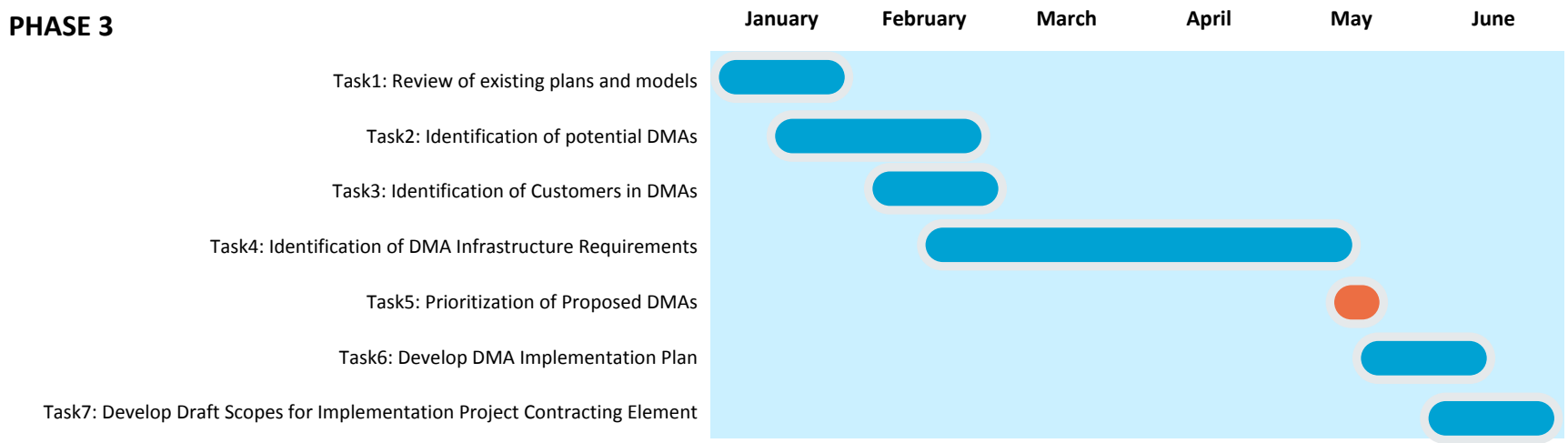

Table 1: Proposed Project Schedule, Organized by Task

Project Cost

Phase 3 lump sum cost is $250,000.

WSO will submit monthly invoices based on task percentage completion.

APPENDIX A – PROJECT ORGANIZATIONAL CHART

PHASE 3:

This phase of the project will be led by Steve Preston. Reinhard Sturm will assist in a project advisory role. Peter Jinks of WSO will serve as the project manager for this phase of the project. Peter will be based in Guam for the duration of the project. Peter will be assisted by Kris Williams on data intake and management. Kris Williams will mostly work remotely but it is planned for Kris or one of WSOs Leak Detection Specialists to be on site to assist Peter Jinks during the DMA pressure data collection task.

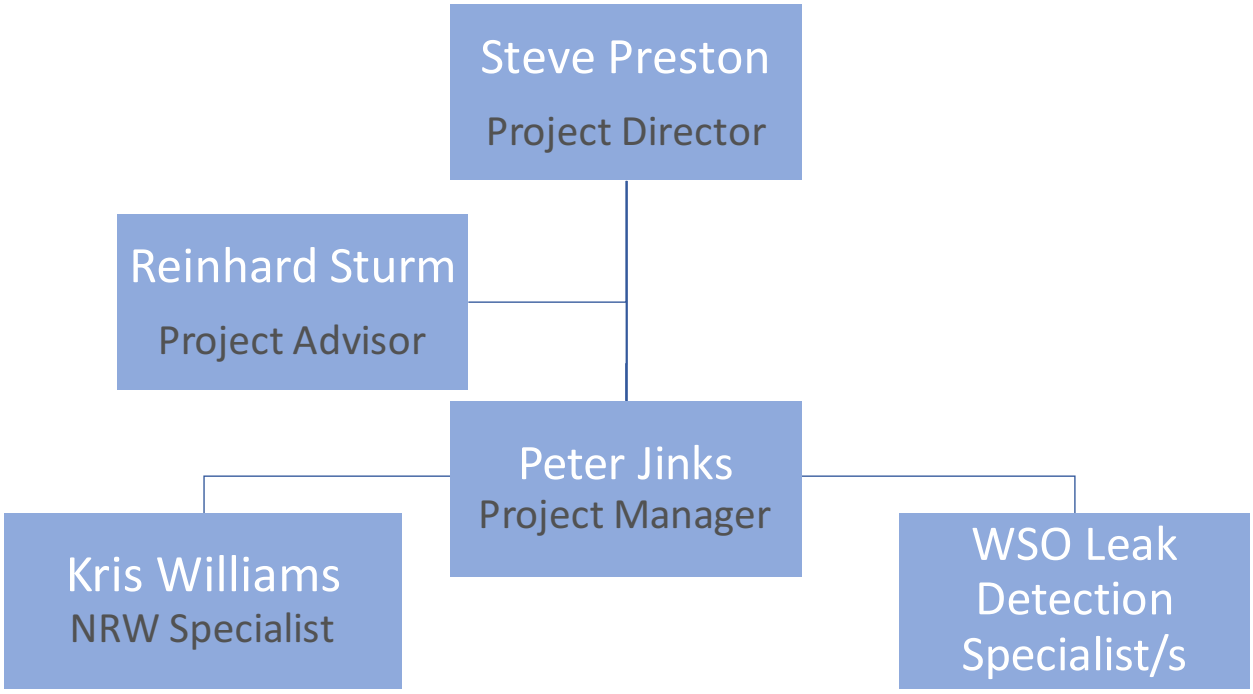

EXHIBIT C

February 3, 2021

Brett Railey, PE
Interim Chief Engineer
Guam Waterworks Authority
Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913

Attention: Garrett Yeoh

RE: Change Proposal 04 for Design Services for GWA's Pressure Zone Realignment and Tank Repair/Replacement, GWA Project W18-001-BND
Nimitz Hill Waterline Replacement and PRVs and Construction Management for Phase 2 Construction

Dear Mr. Railey:

GHD is pleased to submit this change proposal to amend our Scope of Work and Fee for the Pressure Zone Realignment and Tank Repair/Replacement (Pressure Zone Realignment) project. This scope of work defines the additional design services GHD will provide for water system improvements on Nimitz Hill around Nimitz Estates and Mama Sandy areas in Piti. More specifically, the design services will include the design of a waterline replacement, revising the Nimitz District Metered Area (DMA) meter to a pressure reducing/sustaining valve (PRSV)/meter vault, and a permanent pressure reducing valve (PRV) station to replace a temporary PRV. Additionally, this scope will provide budget for construction management services for Pressure Zone Realignment Phase 2 Construction. The original project scope will be amended on a lump sum basis per the fees in the table below.

SCOPE OF WORK

Nimitz Hill Water Improvements

The detailed scope involves revising the Nimitz DMA meter to a station with a PRSV, meter, power source and SCADA panel. The PRSV station would still be on Larson Road, but moved to a lower elevation of about 557. This elevation would lower the pressure of houses on Ocean View to a maximum of 90 psi. Moving the meter will not cause any residences to be outside of the DMA.

Operations is in the process of installing a temporary PRV across the street from the Inter-Island Communications radio station on Route 6. The purpose is to alleviate immediate pressure problems in the area to stop pipe breakage due to excessive pressure. The vault is not going to be constructed to standards

to support traffic loads. The scope of this change proposal will include the design of a permanent PRV station to replace the temporary. No electrical or SCADA design is included with this PRV station.

The existing waterline on Route 6 is Asbestos Cement Pipe (ACP) which is brittle and has been rupturing due to the excessively high pressure in the area. This scope will provide a design for the replacement of approximately 3,600 lineal feet of the existing ACP from the PRV station across from the radio station on Route 6 to an existing PRV after Chalan Sabana in Nimitz Estates. The waterline will bypass the existing PRV at the northeast corner of Route 6 and Nimitz Estates Road. This existing PRV will be repurposed to reduce pressure for services down Route 6.

Construction Management Budget

construction management of the construction of Pressure Zone Realignment Phase 1 has been successfully accomplished on a time and material basis. A budget was assumed for this purpose in the original Scope of Work and Fee. The Pressure Zone Realignment project is expected to have four phases and more budget is needed for construction management of the remaining three phases. This change proposal will provide budget that is estimated to cover the construction management services of Phase 2 construction.

ASSUMPTIONS AND EXCEPTIONS

- This change proposal only applies to the scope of work and contract amount. The terms of the original executed agreement still apply.

FEE SCHEDULE FOR ADDITIONAL DESIGN SERVICES

TASKS	TOTALS
Original Contract Amount	$2,884,767
Change Order 1	$373,670
Change Order 2	$36,294
Contract Amount Prior to Change Proposal	**$2,921,061**
Nimitz Hill Water Improvements	$79,892
Construction Management Budget	$200,000
Guam GRT (at 5.2%)	$14,555
TOTAL CHANGE PROPOSAL COST	**$294,447**
AMENDED CONTRACT AMOUNT	**$3,215,508**

EXHIBIT C

Work that exceeds the scope of this proposal will be brought to your attention for review, approval and fee adjustment. Work performed will be billed monthly based on the estimated percent complete. We stand ready to provide the professional services necessary to assist GWA in this endeavor.

Sincerely,

Aaron Sutton, PE, ENV SP
Project Manager

Attachments: None

Cc: file