

1 **GUAM CONSOLIDATED COMMISSION ON UTILITIES**
2 **RESOLUTION NO. 36--FY2016**

3 **RELATIVE TO APPROVAL OF THE WATER HYDRAULIC MODELING**
4 **DATA COLLECTION BARRIGADA SERVICE AREA**
5 **PROJECT W15-005-EPA**

6
7 **WHEREAS**, under 12 G.C.A. § 14105, the Consolidated Commission on Utilities
8 (“CCU”) has plenary authority over financial, contractual and policy matters relative to the
9 Guam Waterworks Authority (“GWA”); and

10
11 **WHEREAS**, the Guam Waterworks Authority (“GWA”) is a Guam Public Corporation
12 established and existing under the laws of Guam; and

13
14 **WHEREAS**, GWA has received a grant from USEPA under the State Revolving Fund
15 program to improve the water hydraulic model for the Barrigada service area by installing data
16 collection instrumentation that are capable of transmitting real time data via SCADA to GWA;
17 and

18
19 **WHEREAS**, the project boundaries extend out of the Barrigada village due to water
20 system facilities and infrastructure that influence the Barrigada Service Area which include
21 Kaiser Reservoir, Mangilao Reservoirs, Airport Reservoir, Astumbo Reservoirs, Hyundai
22 Reservoir, and Yigo Reservoirs as well as several PRV’s; and

23
24 **WHEREAS**, GWA and USEPA agree that efforts to improve the hydraulic model
25 through real time data collection are necessary and the first step in accomplishing this is through
26 a scope of services that includes general civil engineering, electrical and SCADA, analysis and
27 detailed design; and

28
29 **WHEREAS**, GWA has advertised the Request for Proposal (RFP-12-ENG-2015)
30 soliciting a statement of qualification from experienced and qualified engineering firms to
31 provide engineering design services for the Water Hydraulic Modeling Data Collection
32 Barrigada Service Area; and

1 **WHEREAS**, Request for Proposal (RFP) packages were downloaded by multiple
2 interested parties, from which GWA received proposal submittals from three (3) engineering
3 firms before the RFP submittal deadline; and

4
5 **WHEREAS**, the GWA A-E Selection Committee reviewed and evaluated the three (3)
6 proposals (see EXHIBIT A-Evaluation Score) and made a recommendation to award a contract
7 to the firm GHD Inc. and any successor at interest thereto (see EXHIBIT B- Evaluation
8 Summary and GM Determination); and

9
10 **WHEREAS**, GHD and GWA negotiated the scope and fee for the Engineering services
11 to be provided in the fixed fee amount of Four Hundred Ninety One Thousand Four Hundred
12 Ninety Eight Dollars (\$491,498.00) (see EXHIBIT C – Fee Proposal); and

13
14 **WHEREAS**, GWA Management seeks approval of the fee proposal amount of Four
15 Hundred Ninety One Thousand Four Hundred Ninety Eight Dollars (\$491,498.00), plus a ten
16 percent (10%) contingency of Forty Nine Thousand One Hundred Forty Nine Dollars and Eighty
17 Cents (\$49,149.80), for a total amount of Five Hundred Forty Thousand Six Hundred Forty
18 Seven Dollars and Eighty Cents (\$540,647.80); and

19
20 **WHEREAS**, funding for this project will be from USEPA Grant Funds and, if necessary,
21 GWA 2013 and 2015 Bond Funds; and,

22
23 **NOW BE IT THEREFORE RESOLVED**, the Consolidated Commission on Utilities
24 does hereby approve the following:

- 25
26 1. The recitals set forth above hereby constitute the findings of the CCU.
27 2. The CCU finds that the terms of the fee proposal submitted by GHD, Inc. are fair
28 and reasonable.
29 3. The CCU finds that the terms and conditions set by GWA relative to
30 commencement of work activities are fair and reasonable and serve as a measure
31 of Quality Assurance/Quality Control (QA/QC).
32

4. The CCU hereby authorizes the management of GWA to enter into a contract with GHD, Inc. in the amount of Four Hundred Ninety One Thousand Four Hundred Ninety Eight Dollars (\$491,498.00).
5. The CCU hereby further approves the total funding amount for this project of Four Hundred Ninety One Thousand Four Hundred Ninety Eight Dollars (\$491,498.00), plus a ten percent (10%) contingency of Forty Nine Thousand One Hundred Forty Nine Dollars and Eighty Cents (\$49,149.80), to bring the total authorized funding amount to a maximum of Five Hundred Forty Thousand Six Hundred Forty Seven Dollars and Eighty Cents (\$540,647.80).
6. The CCU hereby further approves the funding source will be from USEPA Grant Funds and, if necessary, GWA 2013 and 2015 Bond Funds.

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

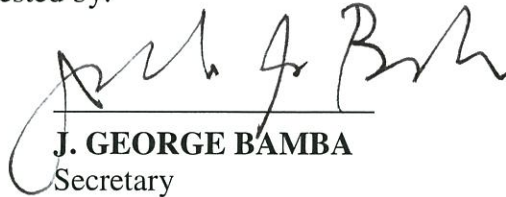
DULY AND REGULARLY ADOPTED, this May 24th, 2016

Certified by:

Attested by:



JOSEPH T. DUENAS
Chairperson



J. GEORGE BAMBA
Secretary

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:	4	_____
NAYS:	0	_____
ABSTENTIONS:	0	_____
ABSENT:	2	_____





GUAM WATERWORKS AUTHORITY

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

December 30, 2015

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

From: Gloria P. Bensaon 
Chairperson, Consultant Selection Board

Subject: RFP-12-ENG-2015
Design Services for Water Hydraulic Modeling Data Collection – Barrigada Service Area
GWA Project No. W15-005-EPA

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

EVALUATION COMMITTEE MEMBERS	
Name	Title
John Davis, P.E.	CIP Wastewater Engineer Supervisor
Barbara C. Cruz, P.E.	Senior Engineer Supervisor
Clinton Huntington II	Senior Engineer
Garrett Yeoh	Senior Engineer

	Consultant	Evaluation Score				DBE	Total	Rank
1.	GHD	83	92.5	89	96	5	365.5	1
2.	Stanley Consultants	79	90	86	98	5	358	2
3.	EMPSCO Engineering Consultants	75	54	48	57	5	239	3

Scores were evaluated based on sum of the individual scores plus additional five points for firms meeting DBE qualifications. 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

Gloria B. Nelson Public Service Building, 688 Route 15, Mangilao, Guam • Tel. (647) 300-6846

MEMORANDUM

December 30, 2015

To: Greg P. Cruz
Acting General Manager

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



Subject: Evaluation Summary
RFP-12-ENG-2015
Design Services for Water Hydraulic Modeling Data Collection – Barrigada Service Area
GWA Project No. W15-005-EPA

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 and shortlisted firms were interviewed.

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

1. GHD
2. Stanley Consultants
3. EMPSCO Engineering Consultants

The evaluation summary sheet is attached for your information.

GENERAL MANAGER'S DETERMINATION

Consultant Firm Selected:

GHD

Remarks:



GREG P. CRUZ
Acting General Manager

Date

12.31.15



May 9, 2016

Mr. Miguel Bordallo, PE
General Manager
The Guam Waterworks Authority
Gloria B. Nelson Public Service Building 688 Route 15,
Mangilao, Guam 96913

Attn. Tom Cruz. PE
Sent via email

Re: GWA RFP-12-ENG-2015, Scope of Work and Fee Proposal,
Water Hydraulic Modeling Data Collection Barrigada Service Area

Dear Mr. Bordallo:

GHD is pleased to submit our Scope of Work and Fee Proposal for the above referenced project. The scope and fee were revised several times in conjunction with discussions with GWA Engineering.

We look forward to working with GWA on this important project and are ready to begin upon GWA's authorization. If you have any questions or comments, please do not hesitate to contact me directly.

Yours sincerely,

A handwritten signature in blue ink that reads "Paul K. Baron".

GHD Inc.
Paul K. Baron, PE, LEED AP, CCM, CPESC
Principal

Attachments, Scope of Work (11 pages), Fee Schedule (1 page)



Guam Water Authority (GWA)
Water Hydraulic Modeling Data Collection Barrigada Service Area

SCOPE OF SERVICES

INTRODUCTION

The purpose of the Water Hydraulic Modeling Data Collection Project for the Barrigada Service Area is to gather selected real-time data to improve Guam Waterworks Authority (GWA) water system hydraulic model accuracy in the Barrigada Area. The additional data gathering capabilities will help GWA to consider pressure zone boundaries, as well as to identify PRV settings, valve locations, valve settings, and hydraulic grades, and to help identify equipment needs in the project area.

This Scope of Services defines the work to design an automated data acquisition system at selected sites in the GWA system to gather real-time field data. The resulting data acquisition system is intended to include field instrumentation, programmable logic controllers, communication systems and an operator terminal unit integrated into the existing GWA systems and coordinated with other GWA master planned improvements.

Table 1 below provides the list of project sites.

Table 1: Project Sites

Reservoir	Pressure Reducing Valves
Barrigada Reservoir #1	PRV #16 @ St. Johns
Barrigada Reservoir #2	PRV #30
Kaiser Reservoir	PRV #11 Carnation
Mangilao Reservoir #1	PRV# 15
Mangilao Reservoir #2	PRV # 71
Airport Reservoir	PRV # 12
Astumbo Reservoir #1	
Astumbo Reservoir #2	
Hyundai Reservoir	
Yigo Reservoir #1	
Yigo Reservoir #2	

The data acquisition system is intended to be setup to automatically read and collect flow rates, levels, and pressures. The system is intended to provide real-time field data that will be used by GWA to improve the accuracy of the water network model and hydraulic analysis results.

The data that can be collected as a result of this project can also be used by GWA to improve the operational efficiencies and diurnal monitoring of the Barrigada project area. The data acquisition system collecting real-time data and alarms shall be integrated with GWA's new Supervisory Control and Data Acquisition (SCADA) system to allow real-time remote monitoring capabilities for the selected monitoring sites.

SCOPE OF SERVICES

TASK 1: Project Management

1.1 Prepare and submit a project management plan that includes the following information:

- A. Project description
- B. Scope of Services (from Contract)
- C. Work plan
- D. Project schedule progress reporting methods
- E. Quality assurance and control plan
- F. Communications plan and contact list
- G. Documentation plan
- H. Subcontractor list

1.2 Provide project coordination support by corresponding with GWA and subconsultants via e-mail or telephone.

1.3 Prepare and submit monthly project status reports with each invoice, including subconsultant's efforts.

1.4 Plan and coordinate six project status teleconferences with GWA and subconsultants.

Deliverable:

- A. Project management plan.

TASK 2: Pre-design

2.1 Documentation Review and Field Investigations:

- A. Review available record documents and drawings for the project area.
- B. Review GWA's SCADA Master Plan. Note that design shall follow the Master Plan guidance and standards.
- C. Conduct an initial field investigation of each site listed in Table 1 to collect the following site information while project sites remain operational during this investigation:

- Existing site conditions, facilities, and operations
 - Site access, drainage, and fencing conditions
 - Process equipment condition
 - Piping and valving configuration and characteristics
 - Instrumentation requirements
 - Demolition/replacement requirements
 - Electrical system requirements
 - Electrical power supply requirements
 - Operational requirements
 - Identify the performance needed and determine the equipment type and quantity of instrumentation to use for the design
 - Identify and recommend conceptual design instrumentation layout
- D. Organize field notes on a site-by-site basis; ensure recordkeeping is up-to-date.
- E. Provide coordination with GWA staff prior to investigations to plan order of sites.
- F. GWA staff will be responsible for providing site access and for opening electrical and control panels, operating electrical and mechanical equipment, opening vaults and boxes, and providing other access as needed for field investigations. GWA staff will also be responsible for site closure and restoration to maintain GWA operations of the facilities.

2.2 Define Requirements:

- A. Identify all required permits based on the anticipated work at each site.
- B. Define design objectives, design criteria, and methodology that shall be used to prepare the design. Identify all relevant codes, standards, environmental regulations, and all applicable local and federal laws that will be incorporated in the design.
- C. Identify storage requirements for data gathering.

- D. Identify hardware support to include redundancy (power outage and disaster recovery) in the event of failure.
- E. Discuss software, data logging and communication requirements with GWA Information Technology (IT) and Information System (IS) Division. Explore the use of the Guam Power Authority's (GPA) smart grid system.
- F. Conduct one on-Island workshop (during the week of field investigations) and one teleconference workshop with GWA's project team to review findings, summary, and path forward from Task 2.

Deliverable:

- A. Requirements summarized in an outline format.
- B. Meeting minutes from workshops.

2.3 Preliminary Engineering Reports - **NOT INCLUDED**

TASK 3: Design

3.1 The design is anticipated to be divided into two bid packages with no alternate bid items as summarized in Table 2 below:

Table 2: Anticipated Bid Packages and Alternate Bid Items

Project Component	Bid Package 1	Bid Package 2
Reservoirs	7 sites	5 sites
PRV's	6 sites	4 sites

The design document will be split into bid packages following the 90% submittal.

3.2 The following is a general description of the key parameters for monitoring and data logging:

- A. Design an automated data acquisition system with the instrumentation, remote terminal units, communication systems, an Operator Terminal Unit (OIT), and other necessary hardware and software between project sites and GWA Engineering Office.
- B. Design and strategize integration of the OIT with GWA's existing water hydraulic model (Innovyze InfoWater Software) allowing GWA to update the water network model using the real-time data collected.
- C. Design power and wiring systems to support the data acquisition system, with a backup power supply.
- D. Design alarms during system failure.

- E. Design and strategize integration of the data acquisition system to GWA's new SCADA master station. The RTU shall send the data and alarms with time stamps to GWA's SCADA master station using DNP3 Secure Authentication over IP protocol through the communication systems.
- F. Prepare layout and process and instrumentation diagram (P&ID) to show instruments location and communication.
- G. Design all necessary piping, valving, fittings, and appurtenances to connect instruments to the project sites. Design approach shall be easy to maintain, such as double block and bleed, and easy to access.
- H. Design recommended civil site improvements that may include access, grading, drainage, fencing, and vaults to support the piping and instrumentation improvements.
- I. Identify commercially available software, hardware and instruments for an integrated system. The remote terminal units shall have programmable logic controller functionality; support DNP3 over IP protocol, and modular to support additional inputs/outputs in the future.
- J. Provide provisions for professional field and classroom training of GWA personnel by the Contractor.
- K. Conduct bi-weekly design status meetings with GWA.
- L. Coordinate with local agencies, such as GEPA to conduct project review meetings (60%, 90% and final) and communicate with key parties involved as needed to obtain input to complete the design process. .
- M. Prepare permit applications for GWA submission and help GWA facilitate permit agency review. Permit fees to be paid directly by GWA.

Deliverables:

- A. Prepare meeting minutes from design meetings.
- B. Finalize the engineering report developed from the preliminary engineering report under Task 2.3 that documents design criteria, engineering calculations, instrumentation integration, communication strategy, operation strategy, Class 2 cost estimate, and supportive data. (3 copies.). – **NOT INCLUDED**
- C. Prepare equipment and instrument list with recommended vendors, brands, model numbers, general specification and power requirement. The list shall be prepared in addition to the technical specifications.

D. 30% Submittal

30% draft design drawings (3 sets – 11x17).
 Table of content for specifications (3 sets, 1 electronic PDF).
 Digital copy of 30% design documents.

E. 60% Submittal

- 60% draft design drawings (3 sets– 11x17).
- Specifications including all spare parts (3 sets).
- Digital copy of the 60% design documents.
- Class 4 engineering cost estimate.

F. 90% Submittal

- 90% draft design drawings (3 – 11x17, 2 sets – 22 x 34).
- 90% technical specifications including all spare parts (3 sets).
- Draft construction schedule (3 sets).
- Digital copy of the 90% design documents.

G. Final Submittal – Prepare bid forms

- Final design drawings (3 sets – 11x17, 3 sets – 22 x 34).
- Final technical specifications (3 sets).
- Stamped engineering calculations as applicable (3 sets).
- Final construction schedule (3 sets).
- Digital copy of the final design documents (PDF, MS Excel, MS Word) and Auto CAD design file.
- Provide two bid packages, as described elsewhere in this scope.

TASK 4: Construction

4.1 Bid Phase:

- A. Prepare bid package.
- B. Assist with preparing answers to questions (RFI's) regarding the bid packages during the bidding phase. Assume two RFI's total.
- C. Assist with the Pre-Bid conference and respond to technical questions involving design and specifications that prospective bidders may have at the Pre-Bid

conference, including the preparation of meeting minutes and providing formal responses to technical questions.

- D. Assist with preparation of bid addenda. Assume one addenda total.
- E. Assist with reviewing construction proposals received. This shall include a bid analysis, review of bid proposal prices, and conformance with contract requirements and the Guam Procurement Code. A letter of recommendation of award shall be prepared.

4.2 Construction Phase:

- A. If requested by the Construction Manager,
 - Review of manufacturer's shop drawings, calculations, samples, test results and other data required to be submitted by the contractor for conformance with the contract documents. Document and provide responses to GWA. Assume 8 submittal reviews (5 first round, 3 second round) total.
 - Assist to address GEPA's inputs, concerns and requirements to contractors and suppliers. Allow 8 hours of coordination.
 - Review requests for design clarification or interpretation submitted by contractor and provide responses to GWA. Assume two clarifications total.
 - Evaluate, approve or disapprove recommendation and substitution requests to determine acceptability of substitute materials and equipment proposed by the contractor and provides recommendations to GWA. This work is included in submittal reviews.
 - Create database of spare parts inventory, maintenance schedule, and standard operating procedures (SOP), troubleshooting, and warranties to be collected from manufacturers. – **NOT INCLUDED**
 - Perform bi-weekly site visits throughout the construction period to ensure installation adheres to the design criteria and construction is progressing in conformance with the contract documents. Submit one site report per visit to GWA. Assume construction progresses over 3 months; therefore, 6 bi-weekly site visits. Subconsultant ArcSine will provide one onsite visit mid-project. GHD will provide bi-weekly site visits, with telephone support by ArcSine.
 - Provide 1 week onsite startup assistance, by ArcSine, to work through issues including SCADA integration.
- B. The scope of services described above for the construction phase will be optimized within the available budget at the time of construction.

Deliverables:

- A. Prepare bid tabulation and letter of recommendation for award.
- B. Prepare meeting minutes when meeting with any other governmental agencies, contractors, vendors or suppliers when related to the Project.
- C. If requested by the Construction Manager, participate in system commissioning and startup.

DESIGN ASSUMPTIONS

Many decisions have already been made by GWA and its consultants, and much of the communications and data acquisition infrastructure will be put in place outside of this Contract. This scope assumes that this project will make good use of the other work and systems, without duplicating efforts, either during design or in construction.

To minimize estimating contingencies, the paragraphs below state certain design assumptions.

1. Communications System Tropos Routers:

This Scope does not allow for designing, furnishing, or installing any new Tropos routers. This Scope does include choosing router locations for up to four that are not within range of any current or planned routers. This Scope assumes GPA power poles exist at the chosen locations for new routers, and no power poles will be furnished and installed under this Project. Chosen router locations will be submitted to GWA for GWA/GPA to install the router(s). Site design will include conduit and interconnection for the site to the router location. It is assumed conduit will be underground. Conduit and interconnection will stub up at the chosen location for the router(s).

2. Programmable Logic Controllers:

This Project will take as a “given” the programmable logic controller choices, including programming environment, under the GWA SCADA Project. Allow 12 person-hours over the duration of the Project for the following:

- a. Receive GWA’s final PLC specifications.
- b. Perform a cursory review to verify applicability to this project.
- c. Incorporate the specifications into this project’s Contract Documents.
- d. Coordination.

3. GWA Supervisory Control and Data Acquisition (SCADA):

This Scope assumes that GWA SCADA system will be up and running in time to accept this project's sites. This project does not comprise a review of GWA SCADA, nor a design of SCADA modifications, but instead implementation of new sites within an existing SCADA framework. (For the purpose of this scope, "existing SCADA" applies to the SCADA system which is planned to exist at the time this project is constructed.) Allow 60 hours over the duration of the project for the following:

- a. Receive information on GWA's SCADA system, its architecture, decisions.
- b. Confirm the means to provide the required workstation. It is assumed that a terminal services connection with the existing SCADA system will suffice.
- c. Specify the required work under this Contract to provide the workstation machine, and allow for that terminal services connection.
- d. No resources are included to design a separate SCADA system, or a temporary SCADA system.
- e. No resources are included to accelerate schedule of the SCADA system, or parts of it, in the event that it is not ready.

4. Standards:

GWA is developing SCADA standards. This scope does not include review comments on the standards. Allow 40 person-hours over the duration of the project for the following:

- a. Receive GWA's Standards.
- b. Perform a cursory review to verify which are applicable to this project.
- c. Write specifications which point to the standards, and contractually cause the Contractor to conform.
- d. Coordination.

5. Data Interface With Water Hydraulic Model:

Per early coordination with GWA, the SCADA-to-Innovyze InfoWater data transfer need not be automated. SCADA data output files can be manually uploaded, by a person, to Innovyze InfoWater.

6. Data Output and Reporting:

The reporting needs (hardcopy and electronic data extraction) for GWA's uses and the water model are unique to that task. The GWA SCADA system will have provisions for electronic and hardcopy reporting.

Over the course of the project, allow 12 hours for the following:

- a. Interview GWA personnel for reporting requirements.
- b. Investigate Innovyze data format requirements.
- c. Specify Contractor-developed reports/electronic outputs.

7. Data Acquisition Intervals:

The intervals at which data can be collected, and the intervals at which they are stored within the SCADA data historian, will be a function of the communications system and SCADA system. This project will take those as "given." Allow 12 hours over the course of the project for the following:

- a. To receive and document GWA data requirements.
- b. To receive and document communications and SCADA interval expectations.
- c. To specify reasonable (and attainable) requirements for this Contractor.

8. Alarm Notification:

- a. GWA's SCADA system will have alarm notification. This project will call for additions to that system to accommodate the sites included. Determination of which conditions to alarm will be addressed as a Contractor-GWA coordination item during construction.

9. Programming:

This scope assumes that programming of the PLC's furnished and installed under this Contract, and configurations of data and screen additions to SCADA, will be by the Contractor. Over the course of the project, allow 12 hours for the following:

- a. Discuss programmer requirements with GWA personnel.
- b. Write general programming requirements, with emphasis on pointing to GWA standards.

No scope is included for prequalifying/sole-sourcing programmer(s).

No scope is included to specify GWA-furnished programming, with the incumbent coordination required.

10. No Other SCADA Components:

The scope does not include other SCADA components which might be requested, such as mobile devices, additional workstations, development machines, and/or related software. It is assumed that SCADA licensing will be adequate as it exists, with no evaluation nor specification of tag count increases, additional terminal services capabilities, etc.

Exhibit C (13 of 13)

Task/Item	Description	Project								ArcSine Engineering Labor and Expenses								ArcSine Fees		Sub-consultant markup	TOTAL
		Principal	Senior Eng	Staff Civil Eng	Senior CAD	Technician	Clerical	Expenses	Hours	Total Cost	Principal Engineer	Senior Engineer	Associate Engineer	Drafting	Technician	Clerical	Expenses	Hours	Total Cost		
		\$261	\$261	\$120	\$121	\$121	\$85			\$194	\$153	\$120	\$81	\$81	\$74						
Task 1 - Project Management																					
1.1	Prepare Project Management Plan		2	2				6	\$932	2	4	8			2		16	\$2,108			
1.2	Team and GWA Coordination		4	4				10	\$1,694	20	20	40			16		96	\$12,924			
1.3	Monthly project status reports (allow for 8)	1	4					7	\$1,475	4	8	4			8		20	\$2,592			
1.4	Project status teleconferences (allow for 6, 1 hour each)	1	4	4				11	\$1,955	6	6				3		15	\$2,304			
	Total Task 1	2	14	10	0	0	8	\$0	\$6,056	32	38	48	0	0	29	\$0	147	\$19,928	\$1,993	\$27,977	
Task 2 - Pre-Design																					
2.1	Documentation review and field investigations																				
	Request documents		2	2				6	\$932	1		4			2		7	\$822			
	Organize and review existing documents		2	4				6	\$1,002			8	4	8			20	\$1,932			
	Review GWA's SCADA Master Plan							0	\$0	4	4						8	\$1,388			
	Initial field investigations (11 reservoirs, 10 PRV's)							0	\$0								0	\$0			
	Recordkeeping for site-by-site information (as investigation progresses)							0	\$0			8					8	\$960			
	Investigation coordination prior to investigations							2	\$170	4		4					8	\$1,254			
	Design level investigations (4 people - 2 GHD, 2 ArcSine, 1 week)	1	40	40				83	\$20,671	70		70				\$10,000	140	\$31,980			
2.2	Define requirements																				
	Identify required permits		4	4				10	\$1,694		4	4			2		10	\$1,240			
	Define design objectives, criteria, and methodology		4	4				10	\$1,694	8	8	8			4		28	\$4,032			
	Identify data gathering storage requirements							0	\$0	4	4	4			2		14	\$2,016			
	Identify hardware redundancy requirements							0	\$0	4	8	4			2		18	\$2,628			
	Coordinate software, data logging, and communications requirements with GWA IT							0	\$0	4	8	16			8		36	\$4,512			
	GWA SCADA coordination							0	\$0	4	8	8			2		22	\$3,108			
	Incorporate standards							0	\$0	2		6			2		10	\$1,256			
	Data output and reporting							0	\$0		4				1		5	\$686			
	Data acquisition intervals							0	\$0		4				1		5	\$686			
	Programmer requirements							0	\$0		2				1		3	\$380			
	Identify site civil improvements		4	4		4		12	\$2,008								0	\$0			
	Identify requirements for piping, vaults, and appurtenances		4	4		4		12	\$2,008								0	\$0			
	Summarize requirements in outline format							0	\$0	2	4	4			1		11	\$1,554			
2.3	Prepare Basis of Design report																				
	Workshops (allow for 1 on-island meeting in conjunction w/ field investigations and 1 telecon.)		4	4				10	\$1,694	8	8				2		18	\$2,924			
	Totals Task 2	8	92	108	0	8	26	\$5,000	\$47,238	115	66	148	4	8	30	\$10,000	371	\$63,360	\$6,336	\$116,934	
Task 3 - Design																					
3.1	Design deliverables:																				
	Design meetings with GWA, bi-weekly (assume 16 meetings, 1 hour each) w/ agenda and minutes	4	8	16				36	\$5,732	16	32				16		64	\$9,184			
	Prepare equipment and instrument list							0	\$0	1	2	8		4	4		19	\$2,080			
	GWA SCADA coordination							0	\$0	8	16	16					40	\$5,920			
	Incorporate standards							0	\$0	4	12	12			4		32	\$4,348			
	Data output and reporting							0	\$0	1	2	2			1		6	\$814			
	Data acquisition intervals							0	\$0	1	2	2			1		6	\$814			
	Programmer requirements							0	\$0	2	2	2			1		7	\$1,008			
	Coordinate with GPA for additional routers							0	\$0	4	2	12	2		2		22	\$2,832			
	Quality assurance/quality control	2	8				2	12	\$2,780	16		16					32	\$5,024			
	30% Design																				
	Specifications - Table of Contents only		2	2				5	\$847	1		2			1		4	\$508			
	Drawings	4	24	40	40			108	\$16,948	11	10	114	114	22			271	\$28,368			
	Construction cost estimating (not included at 30% submittal)							0	\$0								0	\$0			
	60% Design																				
	Specifications		4	4		8	8	24	\$3,172	10	12	10			12		44	\$5,864			
	Drawings	2	16	40	40			98	\$14,338	17	18	111	113	11			270	\$29,416			
	Construction cost estimating	1	2	4	4	8	4	15	\$2,231	1	2	2		4			9	\$1,064			
	Permit applications		2	8	8	8	4	30	\$3,758	1	2	2		4			9	\$1,064			
	90% Design																				
	Specifications	1	4	4		8	8	25	\$3,433	14	18	14			18		64	\$8,482			
	Drawings	2	16	40	40			98	\$14,338	15	24	131	133	40			343	\$36,315			
	Construction cost estimating	1	2	4		4		11	\$1,747	1	2	4		4			11	\$1,304			
	100% Design																				
	Specifications		2	4		4	8	18	\$2,166	12	18	14			18		62	\$8,094			
	Drawings (all work costed here)	2	16	24	40			82	\$12,418	15	24	131	133				303	\$33,075			
	Construction cost estimating	1	2	4		4		11	\$1,747	1	2	2		2			7	\$902			
	Totals Task 3	20	108	194	168	44	39	\$0	\$85,655	152	202	607	495	91	78	\$0	1625	\$186,472	\$18,647	\$290,774	
Task 4 - Services During Construction																					
4.1	Services during bid																				
	Prepare bid package		1	2	2		2	7	\$913	1/2	1				2		4	\$398			
	Respond to RFIs (Assume 2 RFIs)		1	4			2	7	\$911								0	\$0			
	Answer technical questions in writing from pre-bid meeting		1	4			2	7	\$911	1	2						3	\$500			
	Assist with preparing bid addenda (Assume 1 addenda)		1	4	4		2	11	\$1,395								0	\$0			
	Assist with reviewing construction bids		1	2			1	4	\$586	0.5	2				1		4	\$477			
4.2	Services during construction																				
	Perform and issue formal submittal reviews																				
	Assume 5 first round submittal reviews		2	16			8	26	\$3,122								0	\$0			
	Assume 3 second round submittal reviews		2	6			4	12	\$1,582								0	\$0			
	Input for GEPA's concerns/requirements (allow 8 hours)		2	2				4	\$762	2	6						8	\$1,306			
	Design clarifications (Assume 2 clarifications total)		2	4	2		2	10	\$1,414								0	\$0			
	Perform periodic site visits (Allowance)							16	\$1,920							\$5,000	0	\$5,000			
	Participate in system commissioning and startup (assume 1 week)			8				8	\$960	8	20	20				\$5,000	48	\$12,012			
	Totals Task 4	0	13	68	8	0	23	\$0	\$14,476	12	31	20	0	0	3	\$10,000	66	\$19,693	\$1,969	\$36,138	
Task 5 - Determine Scope, Configuration, Strategies of Design Project																					
5.1	Determine desired scope of sites for project							0	\$0								0	\$0			
5.2	Teleconferences with GWA (assume 3 teleconferences)							0	\$0								0	\$0			
5.3	Research existing documents							0	\$0								0	\$0			
5.4	Develop budgetary construction cost estimates							0	\$0								0	\$0			
5.5	Develop planning-level sheet list							0	\$0								0	\$0			
5.6																					