ERIE COUNTY WATER AUTHORITY

INTEROFFICE MEMORANDUM

June 20, 2018

To: Commissioners Schad and Carney

From: Karen A. Prendergast, Comptroller

Subject: EMA Contracts — PNs 20180014 & 20180016

In a memo dated June 4, 2018 (attached), Craig Yokopenic of EMA provided an updated proposal relative to the two projects above based on meetings with Earl Jann and me.

Following is a summary and the current status of each project.

PN 20180014 — Advance Program Phase 2 Consulting Services

Project	Total Cost
Mobility Platform	$ 65,958
Operations and Maintenance Reorganization for Plants & Pump Stations	100,696
WTP SCADA System Master Plan & Pre-Design	249,760
WTP SCADA System HMI Programming	480,848
Redesign Operations Work Practices	100,625
Redesign Maintenance Work Practices	101,300
Improve Manager Skills and Effectiveness	124,745
IBM System Replacement Plan	49,923
Cityworks Implementation at the Plants & Pump Stations	296,672
Total Project Cost	$ 1,570,527

Earl had requested comments on the revised scope from Mike Haendiges and Russ Stoll.

PN 20180016 — Advance Program Phase 2 Consulting Services Customer Service and Accounting

Project	Total Cost
Mobilization	$ 39,094
Interviews & Requirements Gathering	126,744
Inventory & Review existing Business Processes	36,140
Meter to Cash Leading Practice Review	35,946
Prepare/Review/Update Functional & Technical Requirements	92,263
Interface Requirements	36,672
Conduct Drill-down sessions & Detailed Requirements	58,126
Project Management	34,958
Total Project Cost	$ 459,943

I have reviewed the new scope of services and drafted a Professional Services Contract for CIS/ERP project only. A separate contract will be negotiated for project 20180014.

The draft contract has not been reviewed by, or discussed with, EMA. I would like to discuss moving the IBM System Replacement Plan to project 20180016 with EMA. The replacement plan is designed to ensure that all the IBM applications have been considered or replaced and the IBM Power System can be retired.

With the Board's approval, I will submit the draft contract to the Legal Department for review and continue my discussions with EMA. It is my hope to have a resolution to award and execute the contract for ERP/CIS Consulting services in the July 26th Board meeting.

EMA·
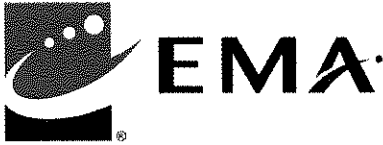
EMA, Inc.
2355 Highway 36 West, Suite 200
St. Paul, MN 55113-3819

phone: 651.639.5600
www.ema-inc.com

MEMO

DATE: June 4, 2018

TO: Earl Jann, Executive Director

FROM: Craig Yokopenic, Executive Vice President

SUBJECT: ECWA scope negotiations for Advance Program Phase 2 Consulting Services, ECWA Project No. 20180014 and Project No. 20180016

Attached are the updated scope and cost documents based on our last conversation. The Phase 2 projects continue the work from Phase 1 and tie back to the objectives defined in the previously completed organization assessment. During the original assessment multiple goals were established to improve Authority operations. The program involved changes in work practices, job functions, organizational design, and implementation of leading technologies. Through this ECWA has shown the commitment to stay focused on organizational goals even as difficult cultural change was underway. All the work in Phase 1 is currently completed except for the construction of the Distribution SCADA and the WAN. These construction projects are multiyear efforts. Both will be completed on schedule in 2018.

The Phase 2 projects will use these and other investments ECWA has made in core systems to provide significant opportunities for ECWA to modernize operations, reduce costs, reduce risk and provide more transparency.

ECWA staff has had significant roles is the Phase 1 projects and positive impact on the results to date. EMA has been working with utilities for over 40 years and ECWA leadership and staff are among the top organizations we have worked with on difficult programs like ECWA Advance. We look forward to working with ECWA on Phase 2.

If there are any questions, please contact me.

Craig

ECWA PHASE 2 ADVANCE RECOMMENDED PROJECTS

The attached document are the updated recommended projects for the Phase 2 Advance Program, RFP 20180014. This document replaces the recommended projects provided in Section 4 of our proposal. The cost tables provided with each recommended project replaces the cost table provided in Section 5 of our proposal.

The project details can be found on the following pages:

The following table provides the overall cost for each recommended project, detailed costs can be found following each recommended project. The project management costs are spread across multiple projects. We have not included project management costs in projects that we expect to run in parallel to other projects.

Project	Total Cost
Mobility Platform	$ 65,958
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MOBILITY PLATFORM

Through the IT Governance process, an evaluation of the Trimble Unity Software will be completed to determine if Trimble Unity or the Freeance Mobile product will be implemented. The selected solution will provide functionality for staff to utilize Cityworks functionality in the field, at the plants, and in the pump stations. The mobility vendor analysis and selection will require the formation of a Mobility Team, this team will continue to work with the product the implementation of the system.

Phases 2, 3, 4 Procurement

The requirements for the mobility solution have been developed. These requirements and license counts will be used to develop a scope document to procure the solution and vendor implementation tasks through the state contracting process.

The configuration requirements will be developed with the Mobility Team. This will determine how the solution will be configured. The responsibilities for configuration, training, testing, and documentation for the vendor staff, EMA, and ECWA staff will be define. Two workshops will be conducted to define, review, and confirm the configuration, testing, and training requirements and responsibilities.

The documentation will be developed by EMA and reviewed by the Mobility Team in a short workshop. Upon approval, EMA will work with the ECWA Procurement staff to obtain the software, licenses, and services.

Phases 5, 6, 7, 8 Implementation Support and Testing

EMA will provide management of the software installation, configuration, and Cityworks integration tasks completed by the mobility vendor. This will include development of schedules, review of progress, review of invoices, and responding to Requests for Information. This activity is expected to last for one week followed by the testing and training phase.

EMA will develop test requirements to test the Cityworks interface and the mobility solution. Testing will be completed on-site at the service center using wireless local area network and Verizon Cellular connections. Testing will cover the normal functionality of the Mobility Solution along with loss of communication, loss of power, and forced application shutdown events.

EMA will review the training materials provided by the vendor and will audit initial classes for content and delivery.

With the testing and training complete, EMA will review and provide comments on all documentation delivered by the vendor.

Phase 9 Mobility Opportunities Analysis

A review of other ECWA systems and services will be completed to identify where the Mobility Solution can be leveraged and used. A report will be generated and presented to the Mobility Team and the IT Governance Committee.

Deliverable

1. Mobility Solution Configuration Requirements and Task Assignments

2. Mobility Solution Procurement Scope Documents

3. Procurement Support

4. Implementation Plan

5. Testing Plan

6. Training Plan and Materials Gap Analysis

7. Mobility Opportunities Analysis Report

Outcomes

This activity will provide greater access to the functionality of the Cityworks system when using a tablet or phone. This will reduce the requirement for a portion of the user base to use a laptop in the field or to return to the Service Center to complete Cityworks tasks. This results in improved efficiency of operations in the field.

Budget

Phase	Mobile	PM Philip Gaberdiel $311 Hrs	PM $	SME1 Jeffrey Coulson $250 Hrs	SME1 $	SME3 Heather J. Haskell $150 Hrs	SME3 $	SME4 John Kidd $120 Hrs	SME4 $	Total Hours	Total Labor	Expenses 0%	Total Dollars
	Project Management	18	$5,598.00	0	$0.00	0	$0.00	0	$0.00	18	$5,598.00	$0.00	$5,598.00
1	Develop configuration requirements	0	$0.00	32	$8,000.00	32	$4,800.00	24	$2,880.00	88	$15,680.00	$1,440.00	$17,120.00
2	Develop scope and quote request documents	0	$0.00	16	$4,000.00	16	$2,400.00	0	$0.00	32	$6,400.00	$1,440.00	$7,840.00
3	Support procurement process	0	$0.00	16	$4,000.00	0	$0.00	0	$0.00	16	$4,000.00	$0.00	$4,000.00
4	Support implementation and configuration	0	$0.00	8	$2,000.00	40	$6,000.00	0	$0.00	48	$8,000.00	$2,570.00	$10,570.00
5	Develop testing plan	0	$0.00	0	$0.00	0	$0.00	16	$1,920.00	16	$1,920.00	$0.00	$1,920.00
6	Testing and training support	0	$0.00	0	$0.00	24	$3,600.00	24	$2,880.00	48	$6,480.00	$3,615.00	$10,095.00
7	Documentation review	0	$0.00	4	$1,000.00	12	$1,800.00	12	$1,440.00	28	$4,240.00	$0.00	$4,240.00
8	Plan development for software solutions	0	$0.00	16	$4,000.00	0	$0.00	0	$0.00	16	$4,000.00	$575.00	$4,575.00
9													
	Total Project Hours	18		92		124		76		310			
	Total Project Dollars	$5,598.00		$23,000.00		$18,600.00		$9,120.00			$56,318.00	$9,640.00	$65,958.00

OPERATIONS AND MAINTENANCE REORGANIZATION FOR THE PLANTS AND PUMP STATIONS

EMA will continue our work in developing the tasks, responsibilities, and organizational structure for the operation of the pump stations, tanks, and the two water plants. The organization design will reflect the progress already achieved in streamlining operations through the consolidation of the pump station and Van de Water Plant control rooms. It will build upon the standard operating procedures developed in the implementation of the new Process Control System. The organizational design will be developed for the to-be state of operations and maintenance technology within ECWA. The operations staffing levels will reflect improvements in the automatic controls used to run the pump stations, including multi-station level and pressure controls, and a Distribution Energy and Quality Operations Optimizer that will match production and pump to meet the demand forecast at the lowest energy costs while maintaining quality and fire protection levels.

Successfully completing this task will allow ECWA to confidently adjust staffing levels to an optimized level. It will also allow ECWA to provide accurate quantified data in support of the staffing strategy.

Phase 1 Leadership Workshop

We will conduct a four-hour workshop with ECWA leadership to discuss the options and constraints associated with possible reorganization strategies. We will review with ECWA the issues and options associated with:

- The Union Contract

- Operator licensing requirements

- Current staff skill levels

- Current staffing levels

- Projected workforce attrition

- A prioritized, quantified list of the work tasks and the associated frequency. Often operations and to a limited extent maintenance task offer a flexibility that allow for a more efficient staffing level.

- Overtime

- Staffing strategies - Work distribution across weekday days, weekday nights, weekend and holiday days and weekend and holiday nights.

- Advanced automation through SCADA – benefits include consistent optimized operations, optimized operational costs as ECWA continues to grow, advanced data analytics

- Use of the WAN

- Ongoing cost of labor

- Advanced planning and scheduling techniques

- Security and Cyber security

- Increasing regulation and watershed management.

- And many others

After reviewing these issues and options we will work with ECWA leadership to establish range of options to consider as part of the reorganization.

Deliverable

1. Documented position on O&M reorganization objectives

2. List of issues and options associated with reorganization

Phase 2 Operations and Maintenance Shadowing and Work Task Documentation

We will shadow operations staff during each of the four shift variations below. We understand there are more than 4 shifts but understanding the work and issues during the identified times will be sufficient to provide possible options for change.

1. weekday days

2. weekday nights

3. weekend and holiday days

4. weekend and holiday nights

We will document our observations with photographs and in a written memo.

We will either update the recently developed SOP's (if task frequency, priority and level of effort is included) or use the SOP's to supplement our observations. We will identify specific tasks frequency and durations. This data set is basis for the analysis and development of staffing options.

Deliverable

1. Work task database (task, duration, frequency, priority)

Phase 3 Cityworks Analysis

Pump stations and the plants maintenance work documented in Cityworks will also be included in the analysis. As Cityworks is expanded to the plants and pump stations the preventative and predictive maintenance tasks need to be optimized to allow trades staff to complete the work in an efficient way. PMs and PdMs will not be viewed independently; rather, the work required to maintain a system, or a remote station will be analyzed to determine what PMs and PdMs can be grouped and consolidated to reduce travel and preparation time and to increase wrench time. This approach is a continuous effort, as

equipment ages and is moved off the desired performance curve, additional PMs are required, triggering an analysis of the work needed. When new equipment is installed, new maintenance tasks may be required adjusting the grouping of tasks by trade.

This work results in a prioritization and an expected duration for the maintenance task that can be used by the planner scheduler to optimize the use of staff resources to complete the work for a given period, be it a day, a week, or a month assigned to staff or a crew.

Deliverable

1. Updated work task database (task, duration, frequency, priority) developed in phase two

Phase 4 Work Task Analysis

Using the data collected in the previous two tasks (Phase 2 Shadowing and Work Task Documentation and Phase 3 Cityworks Analysis), we will focus on the work that needs to be completed today, and identifying the knowledge, skills, and experience of staff to complete it. We will use a variety of tools and processes to identify and quantify labor and task data including:

*   Work tasks needed for current operations and how they can be spread across the various shifts

*   Staffing levels needed to execute the identified work tasks

*   Staff skills and qualifications needed to perform the identified work tasks

The data collected will be analyzed using EMA's resource loading tool (PinPoint). This tool allows us to capture details about current workload. Current workload includes tasks performed on a regular basis and tasks performed on an infrequent or non-routine basis. Other details include the needed skills, frequency, and duration of specific tasks.

We will review the current work documented in the Cityworks system. We will look at completed work orders, existing backlog, and anticipated corrective maintenance. This work will also be categorized by skill level.

We will conduct a skills assessment survey to document staff skills, how they are used, and identify current documentation that exists or methods to retain the knowledge or skill.

EMA will conduct workshops with staff to validate the information collected and make updates as needed.

Once the work has been identified, we analyze net availability of staff time against existing people, hours, and skills. We will use resource loading to document the skills and amount of time for the tasks required of a particular area. We will analyze the work that needs to be performed by skill set and quantity to determine the full-time equivalents (FTEs) needed to complete the work. The analysis will also categorize staff utilization, as well as periodic work spikes (storm event, power outage, etc.) or dips so the strategies to deal with these issues can be developed.

We will use our understanding of the quantity and timing of your current work to determine management practices to meet ECWA's requirements and improve your staff's ability to plan and schedule work. These management practices will be used in the manager training task.

Deliverables

1. Finalized work task database (updated with required skills, qualifications, etc.)

Phase 5 Technology Application to Optimize Work Tasks

We will combine the data collected and analyzed above with the capabilities of the technologies currently being implemented. This will identify additional opportunities for ECWA to consider as part of the staffing strategy.

Deliverable

1. Technology options memorandum

Phase 6 Leadership Workshop to Review Options

We will update leadership with the collected information. We will provide options for reorganization and any constraints to moving forward; needed training, issues that need to be addressed, and any additional data and reporting needs.

Deliverable

1. Reorganization strategy options

2. Finalized strategy for reorganization

Phase 7 Reorganization Implementation Plan and Schedule (multi - year) draft and final

Based on the information collected and recommendations from leadership we develop a multiyear implementation plan that takes all the information into account. The plan will layout a structured approach to make staffing adjustments, change job descriptions, define needed skills, address staff attrition, technology becoming available, and any other drivers and constraints.

The draft plan will be submitted to ECWA leadership for review and comments.

All comments will be incorporated into the final document and submitted to ECWA.

Deliverable

1. Draft reorganization implementation plan and schedule

2. Final reorganization implementation plan and schedule

Budget

Phase	Operations and Maintenance Reorganization	PIC Craig E Yokopenic $373	Hrs	Admin Kristina M Ward $141	Hrs	SME1 Jack T Geisenhoff $247	Hrs	SME2 Rajan Jha $113	Hrs	SME3 Jeffrey Coulson $253	Hrs	Total Hours	Total Labor	Expenses 0%	Total Dollars
1	Leadership Workshop	$4,849.00	13	$1,410.00	10	$1,976.00	8	$0.00	0	$0.00	0	31	$8,235.00	$960.00	$9,195.00
2	O&M shadowing and work task documentation	$1,492.00	4	$6,768.00	48	$2,964.00	12	$8,136.00	72	$0.00	0	136	$19,360.00	$1,600.00	$20,960.00
3	Cityworks analysis	$0.00	0	$5,640.00	40	$0.00	0	$0.00	0	$0.00	0	40	$5,640.00	$0.00	$5,640.00
4	Work task analysis	$746.00	2	$13,536.00	96	$10,868.00	44	$4,520.00	40	$0.00	0	182	$29,670.00	$5,680.00	$35,350.00
5	Technology application to optimize work tasks	$0.00	0	$0.00	0	$0.00	0	$0.00	0	$1,518.00	6	6	$1,518.00	$0.00	$1,518.00
6	Leadership workshop to review options	$3,730.00	10	$1,974.00	14	$2,964.00	12	$0.00	0	$0.00	0	36	$8,668.00	$1,000.00	$9,668.00
7	Reorg implementation plan and schedule draft and final	$1,865.00	5	$9,024.00	64	$2,964.00	12	$0.00	0	$0.00	0	81	$13,853.00	$0.00	$13,853.00
8	Project managment	$0.00	0	$4,512.00	32	$0.00	0	$0.00	0	$0.00	0	32	$4,512.00	$0.00	$4,512.00
	Total Project Hours		34		304		88		112		6	544			
	Total Project Dollars	$12,682.00		$42,864.00		$21,736.00		$12,656.00		$1,518.00			$91,456.00	$9,240.00	$100,696.00

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ECWA Advance Phase 2 Consulting Services

WTP SCADA SYSTEM MASTER PLAN & PRE-DESIGN

Project Approach

ECWA is currently replacing the existing HSQ SCADA HMI System being used for the Water Distribution System with a GE iFix HMI System. GE iFix is the HMI System currently being used at both of ECWA's water treatment plants. The new Distribution SCADA System will include several features and functions not currently available in the plant control systems. ECWA wants to upgrade the plant systems to take advantage of the new features being implemented as part of the new Distribution SCADA. In addition, there are several other enhancements and improvements to the plant SCADA Systems that ECWA wants to consider.

EMA will assist ECWA to develop a plan for the upgrade and enhancement of the existing SCADA Systems at the Van de Water and Sturgeon Point water treatment plants. Having a formal plan will help ECWA to better budget for and manage the treatment plant SCADA improvements.

After the Master Plan has been completed, EMA will conduct pre-design activities for the projects identified by the plan. The Pre-Design Report will be the basis for moving forward with detailed design and implementation. An Implementation Plan will be developed that outlines the implementation approach for each project.

Work Plan

Phase 100   Project Management

Task 110   Conduct Kickoff Meeting

A Project Kickoff meeting, chaired by EMA's Project Manager, Dean Foote will be held. We will review the planned tasks, with special emphasis on the site visits, workshops, and review meetings that will involve ECWA staff. We will also review the general format, planned content, and scheduled delivery dates for all project deliverables.

Deliverables

1. Kickoff Meeting Agenda and Minutes

Task 120   General PM

The EMA Project Manager will direct the activities of the project team. The EMA PM will also conduct monthly progress meetings and prepare monthly progress reports and invoices.

Deliverables

1. Monthly Progress Meeting Agendas and Minutes

2. Monthly Progress Reports and Invoices

Phase 200   Document Current State

Task 210   Review Existing Documentation

EMA staff already has a basic understanding of the architecture of the control systems at both treatment plants. In this task, EMA will perform an in-depth review of existing documents to gain a more complete understanding of the SCADA Systems currently in use by ECWA. As part of this review and during the site visits, we will make note of missing or out-of-date documentation.

Task 220   Conduct Site Visits

EMA will conduct a two-day site visit to each water treatment plant. The purpose of the site visits is for our project team to develop an overall understanding of the existing SCADA System components and systems. Our site visit team will take copies of the applicable system documentation along to each site and perform spot checks of the accuracy, currency, and completeness of the documents. Our site visit team will compile field notes and take digital photos at each location. These notes and photos will be included as appendices in the Current State Technical Memorandum.

Deliverables

1. Site Visit Notes and Photos

Task 230   Conduct Staff Interviews

EMA will conduct one-on-one interviews with several ECWA staff. It is valuable to get the input of these key individuals in a more personal environment outside the Stakeholder Workshops that will be conducted in Task 310. In most cases, the staff selected for the personal interviews will also participate in the Stakeholder Workshop.

Deliverables

1. Interview Notes

Task 240   Develop Current State Technical Memorandum

EMA will develop a technical memorandum (TM) that provides a high-level overview of the current state of the existing SCADA Systems. The overview will describe general functionality and characteristics shared by Van de Water and Sturgeon Point systems along with specific information about each individual system. For each SCADA System, the TM will provide a conceptual block diagram of the existing SCADA System along with a Process Flow Diagram (PFD).

EMA will prepare a draft version of the Current State Technical Memorandum for ECWA review. After a two-week review period, EMA will conduct a half-day workshop to discuss the TM. After the workshop, ECWA will have an additional week to accumulate review comments and provide a consolidated set of comments to EMA. ECWA's review comments will be

incorporated into the final version of the Current State TM, which will be included as an appendix to the SCADA Master Plan.

Deliverables

1. Current State Technical Memorandum (draft and final)

Phase 300 Define SCADA Requirements

Task 310   Conduct Stakeholder Workshop

EMA will conduct a workshop with ECWA's SCADA System Stakeholders to review current SCADA System functionality and performance and to discuss areas that require upgrade and enhancement. The workshop should include representatives from several different functional groups such as plant operations, maintenance, SCADA System support team, process engineering, management, etc. EMA will work with the ECWA to determine the appropriate functional groups and specific participants from each group.

EMA will distribute a SCADA System Requirements Checklist to the participants in advance of the workshop. This checklist summarizes the major issues that should be considered when defining requirements for SCADA System upgrades and enhancement and, by reviewing it, the workshop participants should be better prepared to contribute to the workshop.

EMA will prepare a structured workshop agenda which will help ECWA staff focus on the operational requirements for the new/upgraded SCADA Systems. We will review the current conditions and existing functionality (sometimes referred to as the "As-Is" state). Typically, there are many features and functions of the existing systems that work well, and which should be retained in any new systems. We will also discuss features and functionality that are missing or not ideal in the current installation, including system expansion capability ("To-Be" state). We will identify system components that need near term replacement by virtue of their age, obsolescence, or their functional limitations. During the requirements workshop, EMA will lead ECWA staff in a discussion of the steps necessary to improve the functionality and performance of their existing SCADA and communication systems. These discussions will be mindful of the existing systems and the need to maximize ECWA's return on their existing SCADA investments, but with a forward-looking vision for moving their SCADA Systems toward industry best practices. The workshop will also include discussions of specific SCADA System implementations by other Utilities of similar size.

The workshop will also review features and functions that are being implemented as part of the Distribution SCADA Replacement project to ensure that they are being included in the requirements for the plant SCADA upgrades.

Deliverables

1. System Requirements Checklist

2. Stakeholder Workshop Agenda, Presentation Materials, and Minutes

Task 320   Conduct Vision Workshop

At this point in the master planning process, it is beneficial to brief ECWA Management on the progress of the project and to engage them in developing a Strategic Vision for the treatment plant SCADA Systems. As a result of the site visits and requirements workshop, EMA will have a solid understanding of the status of the existing systems as well as a perspective on the system additions and enhancements required.

EMA will conduct a half-day workshop which will address the following items:

- SCADA System Overview
- SCADA System Benchmarks
- Development of SCADA System Strategic Vision

We will begin the workshop with a SCADA System Overview. Although the members of ECWA Management may be familiar with SCADA Systems in general, it is helpful to provide a brief discussion of the terminology and general considerations involved with SCADA and Communication Systems. As part of this overview, we will discuss industry trends and relate them to the systems and components currently in use by ECWA.

Next, we will present a discussion of SCADA System Benchmarks. EMA has developed a list of benchmarks that represent the industry-best practices being employed by progressive Water/Wastewater Utilities. Review of these benchmarks helps to set the stage for the improvements and enhancements that will be considered for ECWA's SCADA Systems.

And, finally, EMA will lead ECWA Management in developing a Strategic Vision for the SCADA Systems. This vision should consist of three to four concise, pragmatic statements which define the strategic goals for the way ECWA will use the SCADA Systems to support the overall strategic goals for the ECWA.

Deliverables

1. Vision Workshop Agenda, Presentation Materials, and Minutes

Task 330   Conduct Requirements Validation Workshop

After the System Requirements workshop and Vision workshop have been completed, EMA will categorize the issues discussed and prepare a summary of the business and functional requirements identified by ECWA staff along with those recommended by EMA based on industry best practices. EMA will conduct a workshop to present the summary of requirements to ECWA.

Deliverables

1. Workshop Agenda, Presentation Materials, and Minutes

Task 340   Develop SCADA Requirements Technical Memorandum

EMA will develop a technical memorandum that summarizes the business and technical requirements defined for the SCADA Systems. The TM will contain the following subsections:

- Overview

- Summary of Functional Requirements
  - Business Drivers
  - Overall SCADA System Architecture
  - Control Philosophy
  - HMI Hardware and Software Functionality
  - HMI Graphic Standards
  - Alarm-Event Management
  - Workflow Management
  - Data Management (Historian) and Reporting
  - Communication Systems Design and Functionality
  - PLC/RTU Design and Functionality
  - Cyber Security
  - Disaster Recovery/Business Continuity
  - Integration
  - Instrumentation
  - Organization, Practices and Procedures
  - Documentation
  - Optimization
  - Standards

EMA will provide a draft version of the TM for ECWA review. After a two-week review period, EMA will conduct a half-day workshop to discuss the TM with ECWA. After the workshop, ECWA will have an additional week to accumulate review comments and provide a consolidated set of comments to EMA. ECWA's review comments will be incorporated into the final version of the SCADA Requirements TM, which will be included as an appendix to the SCADA Master Plan.

Deliverables:

1. SCADA Requirements Technical Memorandum (draft and final)

2. Review Workshop Agenda, Presentation Materials, and Minutes

Phase 400 Develop SCADA Master Plan

Task 410   Develop Draft Master Plan

After completion of the SCADA Requirements TM Review Workshop, EMA will develop the draft SCADA System Master Plan.

The SCADA Master Plan will contain the following sections:

- Executive Overview

- Overview of Current State

- Summary of Functional Requirements

- Description of Short-term Projects

- Description of Longer-term Projects

- Appendices
    - Budgetary Cost Estimates
    - Overall Project Schedule
    - Cash Flow Estimates
    - Current State TM
    - SCADA Requirements TM

The Executive Overview will consist of a short summary of the detailed recommendations provided in the body of the master plan. It will contain a table that lists each recommended project along with budgetary costs. The Overview will also contain a high-level schedule that illustrates the overall duration along with key dependencies.

The Overview of Current State presents the "As Is" state of ECWA's existing SCADA Systems. More detailed information is contained in the Current State TM, provided as an appendix.

The Summary of Functional Requirements defines the "To Be" state for the ECWA SCADA Systems. Again, more detailed information is contained in the SCADA Requirements TM, provided as an appendix.

The Master Plan will then describe a set of projects which implement the recommended SCADA System improvements. For each project, a conceptual scope of work, implementation schedule, and budgetary cost opinion will be provided.

Short-term projects consist of those projects which should be undertaken in the next six months to one year. It is not uncommon for simple system issues to be identified or more clearly defined during the site visits, staff interviews, and requirements workshop. These issues, sometimes referred to as "low hanging fruit," are typically relatively straightforward to correct and normally require a limited budget.

Longer-term projects are typically more complex and require a more extensive budget and schedule than the short-term initiatives. Many of these projects are inter-related, and the dependencies and execution sequence will be clearly defined. In addition, since the longer-term projects generally require significant investments, they will need to be prioritized to accommodate ECWA's budgetary constraints. An Overall Project Schedule and Cash Flow Estimates by fiscal year will be provided as appendices to the master plan.

Deliverables

1. SCADA System Master Plan (draft)

Task 420   Conduct Master Plan Review

EMA will provide a draft version of the SCADA Master Plan to ECWA for review. After a two-week review period, EMA will conduct a full-day workshop to discuss the draft Master Plan with ECWA's Core Team. After the workshop, ECWA will have an additional two weeks to accumulate review comments and provide a consolidated set of comments to EMA.

Deliverables

1. Review Workshop Agenda, Presentation Materials, and Minutes

Task 430   Develop Final Master Plan

EMA will incorporate ECWA's review comments into a final version of the Master Plan. The final document will be delivered in both printed form (5 copies) and well as electronic format (CD with pdf files).

Deliverables

1. SCADA System Master Plan (final)

Task 440   Present Final Master Plan to Stakeholders & Management

EMA will conduct a one-hour presentation to present the final SCADA Master Plan to ECWA's Core Team and stakeholders who participated in the master planning project. A separate presentation will be also provided for ECWA Management.

Deliverables

1. Presentation Materials

Phase 500   Develop WTP SCADA System Pre-Design

The SCADA System Master Plan will provide high-level scopes of work and budgetary cost estimates for a series of projects to upgrade and improve the SCADA Systems currently in use at the water plants. The Pre-Design phase will focus on development of the detailed requirements and design parameters for the SCADA System upgrade projects. This phase

will ensure that ECWA's operational requirements are clearly and accurately reflected in the detailed design of the system upgrades.

EMA's project approach is based on a substantial involvement by ECWA staff. The significant and ongoing involvement by ECWA staff will help to ensure the upgraded SCADA Systems fully meets ECWA's operational requirements and will prepare the Authority's staff for continued support of the system.

Before undertaking the actual design of the replacement SCADA System, it is important to define the associated requirements and to develop several formal standards documents. A number of these standards were developed as part of the Distribution SCADA System replacement project. These standards will be reviewed and adapted to meet the needs of the WTP's. The Pre-Design process will formalize the requirements definition and standards development and will help to ensure that the subsequent design and implementation phases are executed in an efficient and cost-effective manner.

Task 510   Conduct System Requirements Workshops

To accurately document the needs of the end users, Operations, Maintenance, Engineering, and Management staff will be brought together in a series of workshops to discuss the features and functions to be included in the SCADA System upgrade. A questionnaire will be distributed to collect ideas, wants, needs, and wish list items that could be served by the SCADA System. This will form the basis for workshops that will present the ideas, cross reference this to potential solutions, and discuss costs and benefits. The following paragraphs describe the topics that will be discussed during the Requirements Workshops. We have assumed that a total of five Requirements Workshops will be conducted.

Task 520   Develop SCADA System Architecture

The overall architecture of the SCADA System upgrade will be defined. This architecture will address server redundancy, physical location of servers, Historian configuration, location and type of operator workstations, remote/mobile access, etc. This architecture will influence the individual requirements described below.

Task 530   Define HMI Requirements

The following items will be defined:

- List of Displays – identify number and type of display screens required
- Functional Requirements – Trending, Operator Logs, Alarms/Events, User Access, etc.
- Historian and Reporting Requirements
- Other miscellaneous requirements

The Distribution SCADA System will be reviewed to provide consistency among all three systems. EMA will work with the ECWA project team to update/expand the HMI Graphic Standards developed as part of the Distribution SCADA project. These standards will define

the following items: standard screen layout, color standards, graphical symbols, etc. The Graphic Standards will be reviewed and updated throughout the design and implementation phases.

Task 540   Define Server and Workstation Requirements

Hardware specifications will be defined for the SCADA Servers, workstations, Historians, and other related servers. These specifications will need to be reviewed and updated on a regular basis.

Software specifications for these devices will also be defined. These specifications will define the requirements for base system software – operating system and utility software- as well as the requirements for licensed SCADA software (Proficy iFix and related packages).

Task 550   Define PLC Requirements

Hardware specifications will be defined for replacement/upgraded programmable logic controllers (PLC) and formal design drawings and specifications will be developed for typical PLC panels.

EMA will work with the ECWA project team to develop formal standards which describe the concepts and techniques which will be used for programming the replacement/upgraded PLCs. The PLC programming standards developed as part of the Distribution SCADA project will be reviewed and adapted as appropriate.

Task 560   Define Network Requirements

Design requirements for upgrade/improvements to the control system local-area networks (LAN) at both WTP's will be defined. An enhanced network architecture which will provide high-speed communications will be developed. The current IP addressing scheme will be reviewed/updated. The existing switches and media will be evaluated for compatibility with new architecture.

Task 570   Develop Pre-Design Report

At the end of the System Requirements Workshops, EMA will develop a Pre-Design Report (PDR). The PDR will document the specific design requirements identified during the workshops and will serve at the basis of the System Design Phase.

A preliminary outline of the PDR is as follows:

- Overview
- SCADA System Architecture
- HMI Requirements
- Server and Workstation Requirements
- PLC Requirements
- Network Requirements
- Appendix A – HMI Graphics Standards

- Appendix B – PLC Programming Standards

Task 580   Develop Implementation Plan

EMA will develop a preliminary implementation plan for the SCADA System upgrade. The plan will identify the following key project milestones:

- HMI Programming

- PLC Replacement/Upgrade

- Network Upgrade/Improvement

- Factory Testing

- Field Installation & Testing

EMA will lead an Implementation Workshop to identify key operational considerations and constraints associated with the SCADA System replacement.

The implementation plan will also include cost estimates and a schedule for all project phases. While these estimates represent a solid basis for planning purposes, the cost estimates and schedule will need to be reviewed and updated, as appropriate, throughout the design process.

At the end of the pre-design phase, the scope and cost of the design phase will be more fully defined. The project budget for design will need to be determined. Similarly, throughout the design phase, the estimated costs for system hardware and software will be updated on a regular basis. At the end of the design phases, the budgets for hardware and software will need to be adjusted, as appropriate.

Budget

ECWA WTP SCADA Master Plan

Phase		PIC Philip Gaberdiel $297 Hrs	$	PM Dean Foote $254 Hrs	$	Admin Mary E Benson $97 Hrs	$	SME1 Christopher Murray $161 Hrs	$	SME2 Aaron Grabowska $102 Hrs	$	Total Hours	Total Labor	Expenses 0%	Total Dollars
1	Project Management	16	$4,752.00	44	$11,176.00	16	$1,552.00	0	$0.00	4	$408.00	80	$17,888.00	$400.00	$18,288.00
2	Document Current State	0	$0.00	76	$19,304.00	16	$1,552.00	4	$644.00	88	$8,976.00	184	$30,476.00	$600.00	$31,076.00
3	Define SCADA Requirements	8	$2,376.00	56	$14,224.00	8	$776.00	8	$1,288.00	72	$7,344.00	152	$26,008.00	$1,450.00	$27,458.00
4	Develop SCADA Master Plan	8	$2,376.00	72	$18,288.00	24	$2,328.00	12	$1,932.00	72	$7,344.00	188	$32,268.00	$1,450.00	$33,718.00
5	Develop WTP SCADA System Pre-Design	20	$5,940.00	256	$65,024.00	16	$1,552.00	96	$15,456.00	424	$43,248.00	812	$131,220.00	$8,000.00	$139,220.00
	Total Project Hours	52		504		80		120		660		1416			
	Total Project Dollars		$15,444.00		$128,016.00		$7,760.00		$19,320.00		$67,320.00		$237,860.00	$11,900.00	$249,760.00

WTP SCADA SYSTEM HMI PROGRAMMING

Project Approach

The project to replace the existing HSQ SCADA HMI System being used for the Water Distribution System with a GE iFix HMI System is nearing completion. The HMI system for the new Distribution SCADA System includes several features and functions not currently available in the plant control systems. In this project, EMA will provide programming services to modify the existing iFix HMI Systems being used at the Van de Water and Sturgeon Point plants to more closely match the Distribution System. The modifications will include (1) revising/rebuilding existing displays to incorporate High Performance HMI concepts, (2) revising alarm subsystem to eliminate excessive/nuisance alarms, (3) reviewing/updating point tags and descriptions for clarity, and (4) miscellaneous improvements.

The scope and cost estimate for the HMI Programming is based on the following preliminary assumptions:

- Total of 10,000 database points between the two plants

- Total of 200 graphic displays (including unique pop-ups) between the two plants

- Total of 500 alarm points between the two plants

- Total of 4,000 historized points between the two plants

- Project duration of 10 months

The HMI Programming will not begin until completion of the SCADA Master Plan and Pre-Design Report. These activities will provide the opportunity to review and refine the assumptions stated above. At that time, before beginning the HMI Programming project, EMA will provide a more detailed scope of work and a revised cost estimate. In addition, the Master Plan is expected to define improvements to the plant PLC hardware and software along with network improvements. These additional enhancements should be done in conjunction with the HMI Programming and will affect the scope and complexity. The revised scope and costs will take these additional activities into account.

Work Plan

Phase 100   Project Management

Task 110   Conduct Kickoff Meeting

A Project Kickoff meeting, chaired by EMA's Project Manager, Dean Foote will be held. We will review the planned tasks, with special emphasis on the workshops and review meetings that will involve ECWA staff. We will also review the general format, planned content, and scheduled delivery dates for all project deliverables.

Deliverables

1. Kickoff Meeting Agenda and Minutes

Task 120   General PM

The EMA Project Manager will direct the activities of the project team. The EMA PM will also conduct monthly progress meetings and prepare monthly progress reports and invoices.

Deliverables

1. Monthly Progress Meeting Agendas and Minutes

2. Monthly Progress Reports and Invoices

Phase 200   HMI Configuration

EMA will provide services to configure the upgraded GE iFix HMI systems at the two (2) water treatment plants.

Task 210   Planning and Coordination Activities

EMA will review existing HMI graphics and existing HMI standards with ECWA plant operations staff and SCADA team.

EMA will adapt the HMI configuration/graphic standards developed as part of the Distribution SCADA project as necessary to meet the requirements identified for the WTP's. The updated standards will be submitted to ECWA for review and comment. Following ECWA's review, EMA will finalize the HMI standards to be used as basis for HMI configuration. The final HMI standards will be documented and provided to ECWA electronically.

Deliverables

1. Updated HMI Configuration/Graphic Standards

Task 220   HMI Configuration

EMA will re-configure HMI graphics (to updated HMI standards). We anticipate configuring the following approximate numbers of overview, non-standard pop-up and trend graphics, by plant:

*   Van de Water: 100

*   Sturgeon Point: 100

HMI graphics will be submitted to ECWA for approval. The graphics will be updated based on ECWA's comments. We have assumed that the existing HMI tag name convention will be re-used.

Deliverables

1. Updated/Revised HMI Displays

Task 230   Historical Report Configuration

EMA will assist ECWA with development of historical reports using XL Reporter. We will conduct a workshop with ECWA to identify historical reporting requirements by plant. We will then develop

typical reporting templates to meet those requirements. ECWA will then use these templates to develop the desired reports.

Deliverables

1. Historical Reporting Requirements

2. Standard Report Templates

Task 240   Factory Testing

EMA will conduct factory test of the new/revised HMI graphics. We have assumed that a one-week test will be conducted for each WTP. Location of the FAT will be determined.

Deliverables

1. FAT Procedures

2. FAT Test Results

Task 250   Field Testing

After completion of the FAT, the updated HMI displays will be installed at each plant. We have assumed that new servers will be established for the new HMI software. EMA will validate the HMI displays from field points to the HMI screen. We have assumed a one-week field test for each plant.

Deliverables

1. Field Test Procedures

2. Field Test Results

Task 260   HMI O&M Manuals

EMA will develop O&M Manuals documenting HMI configuration standards and specific HMI configuration for each of the water treatment plants. Manuals will be provided electronically to ECWA.

Deliverables

1. HMI O&M Manuals (draft and final)

Task 270   HMI Configuration Training

EMA will conduct training on HMI configuration for each plant. We have allocated two (2) days of HMI-related training per plant.

Deliverables

1. HMI Training Materials

Budget

ECWA WTP HMI Programming	PIC		PM		Admin		SME1		SME2		Total Hours	Total Labor	Expenses	Total Dollars
	Philip Gaberdiel		Dean Foote		Mary E Benson		Farzad Eslami		Gerald Di Noia					
	$297		$254		$97		$168		$112				0%	
Phase	Hrs		Hrs		Hrs		Hrs		Hrs					
1 Project Management	28	$8,316.00	64	$16,256.00	24	$2,328.00	24	$4,032.00	0	$0.00	140	$30,932.00	$2,500.00	$33,432.00
2 HMI Programming	0	$0.00	152	$38,608.00	24	$2,328.00	1,320	$221,760.00	1,560	$174,720.00	3056	$437,416.00	$10,000.00	$447,416.00
Total Project Hours	28		216		48		1,344		1,560		3195			
Total Project Dollars		$8,316.00		$54,864.00		$4,656.00		$225,792.00		$174,720.00		$468,348.00	$12,500.00	$480,848.00

REDESIGN OPERATIONS WORK PRACTICES

As the control system improvements are implemented in the plants and distribution system the work completed by the operations staff will be analyzed to determine how work can be shifted away from active monitoring and frequent manual control actions, to a steady state, automatic control mode with operator intervention for process updates and equipment failures. This will allow operators to shift activities to CLAIR maintenance tasks and will minimize the need to staff the evening, night, and weekend shifts. To allow for increased steady state operations at the plant, the pump stations and tank operations will require a system optimization approach to automatically identify production, storage and pump levels to meet the variable water demands with minimal process changes. The major activities included in this task are:

- Tied to plant SCADA improvements and Distribution SCADA transition plan

- Sturgeon Point plant, Van de Water plant, and Distribution system dynamic and minimal staffing levels. This will allow operations from single location during nights and weekends.

- Allow more automatic control freeing operators to perform light maintenance.

- System wide operating strategies to optimize energy, chemicals, and water quality.

Phase 1 Develop Operation Work Practice Goals and Vision for Desired Work Practices

This task will clearly develop the principals for redesigned work processes. EMA will facilitate workshops with the operations staff to develop principles of operations. The principles will likely include the types of work that an operator will perform, the frequency, and the communication patterns. Additionally, based on this, an organizational structure will be developed in a subsequent task that will best use the operating staff based on the work they will be performing and their location. EMA will provide examples from other utilities to help bring ideas that are different than current

It is expected that this will be performed in 3 workshops.

Deliverables

1. Workshop summary of desired future Operations principals

Phase 2 Document Current Work

This task will define the current work for operating positions and identify inconsistencies between operations staff and facilities. This will also define operations strategies based on season and water quality issues. This will allow an assessment of current work that may need to change existing data on each groups' operations staff and their work will be gathered in this task, much of this data will be included in previously developed SOP's and existing control narratives. If existing data is unavailable, interviews with representative operations staff from each area will take place to document the current work tasks.

Deliverables

1. Documentation of existing operating strategies.

Phase 3 Define Strategies and Steps Needed for Implementation Along with Timeline

In this task, the documented principles will be applied to current work practices. It is expected that there will be specific changes to pump strategies, pressure profiles, backwash strategies and others. We will define system wide operating strategies and the communication protocols between the two water treatment plants.

Strategies to operate in extreme weather conditions, recovery from power outages, low flow situations, eliminate problematic activities, and over nights and weekends will also be developed. Refinement of these strategies will allow ECWA to make organizational changes with low risk.

For any of the strategies we will work with staff to identify the risks associated with various strategies and mitigation processes (business risk model). Many of these will also need to be programmed into the various SCADA systems

A plan and timeline will then be developed for changes in Operations practices to implement the changed practices taking into consideration the timing of controls system improvements and other needs such as revised training.

Deliverables

1. Strategies for improved operations
2. Business Risk Model
3. Implementation plan linked to SCADA improvements and staff development

Budget

Phase	Operations Work Practices	PIC Craig E Yokopenic $373		Admin Kristina M Ward $141		SME1 Jack T Geisenhoff $247		Total Hours	Total Labor	Expenses	Total Dollars
		Hrs		Hrs		Hrs				0%	
1	Develop Operations Goasl and Vision	5	$1,865.00	12	$1,692.00	64	$15,808.00	81	$19,365.00	$4,190.00	$23,555.00
2	Document current work practices	0	$0.00	16	$2,256.00	104	$25,688.00	120	$27,944.00	$3,100.00	$31,044.00
3	Define operations work strategies	2	$746.00	16	$2,256.00	152	$37,544.00	170	$40,546.00	$5,480.00	$46,026.00
	Total Project Hours	7		44		320		371			
	Total Project Dollars		$2,611.00		$6,204.00		$79,040.00		$87,855.00	$12,770.00	$100,625.00

REDESIGN MAINTENANCE WORK PRACTICES

We will continue to develop and enhance work practices. Coupling this with Cityworks enhancements, this will provide options to ECWA leadership to continue optimization.

- Planning and scheduling for treatment plant and pump station maintenance to reduce costs by ensuring high priority work is done first and tools, equipment, materials, and resources are ready before work is initiated. Analysis of work completed.

- Confirmation of asset criticality and recording of criticality in Cityworks to make it readily available to all operations, maintenance, and engineering staff

- Updating of PM Program, including selecting maintenance tactics based on criticality to ensure the right maintenance is done at the right time on critical assets to increase reliability and prevent breakdowns. Includes appropriate use of predictive maintenance techniques.

- Establishment of Asset Condition Monitoring Program with results recorded in Cityworks and protocols to respond to results. This will provide information for future forecasting of remaining useful life and forecasting of replacement costs and timing.

- Consistent use of key maintenance management performance indicators, including managing backlog and costs by asset class and facility, monitoring Cityworks usage and ensuring high quality and complete data is entered.

- Asset onboarding and change control process to ensure the right information about new assets is entered into the system and asset information is kept current.

- Annual planning of major overhauls and shut downs for the following year with estimating of costs and staffing impacts to ensure affordability and that routine maintenance is not impacted.

- Process for reliability analysis for all major failures or failures of critical equipment with actions identified and assigned to prevent future failures.

- Improve maintenance staff skills by providing or supporting specialized training, including achievement of trades qualifications. Better skill levels mean more efficient and effective maintenance work.

Phase 1 Implementation of Planning and Scheduling for Treatment Plants and Pump Stations

In conjunction with the Cityworks Implementation, EMA will assist in implementation of the Planning and Scheduling processes for the Treatment Plants and Pump Stations. This process will involve training and workshops with management and maintenance staff to provide an understanding of the processes and benefits. Included in these workshops and training is the annual planning process for major overhauls and shutdowns. It will also involve working with the designated planner/schedulers to guide the implementation of the processes to help assure that the benefits are reached.

Deliverables

1. Documentation of planning and scheduling processes and tasks

Phase 2 Development of Asset Management Program

This sub-task will develop consistent processes to manage the maintenance processes in a manner that will provide the most effective and efficient asset use. It will include development of a standardized criticality rating system of assets based on business risk. This rating system will then be used to identify the critical assets that require more maintenance attention. This will be established first in a workshop setting, with team members assigned to rate individual assets based on the criteria established.

Working with the critical assets identified, the Preventive Maintenance (PM) program for each will be established. Criteria will be developed to determine and adjust the activities and frequency to best maintain the asset life and prevent breakdowns. This will involve the use of predictive maintenance techniques where appropriate. As part of the PM program, an assessment of each critical asset's condition and expected remaining life will be included at annual intervals. This work will be done in groups with appropriate operations, maintenance and engineering staff involvement.

A process will also be established for a root cause analysis of all failures of critical equipment. This analysis will identify needed changes in operation or maintenance practices to avoid or mitigate similar future failures. This process will be developed in a workshop setting and sample recent failures will be used as a test case.

Deliverables

1. Criticality rating system

2. List of critical assets and associated PMs

3. Root cause procedure documentation

Phase 3 Assistance in Maintenance Management Practices

This sub-task provides overall assistance and guidance in effective maintenance management practices to assure that the benefits of the practices are achieved. This includes the use of reporting and performance measures to manage the program. Included in these measures is that of skill assessment and identification of training needs. Additionally, a review of the processes used to assure that the practices can be maintained as assets change. This will include asset onboarding and management of change with assets.

The sub-task will begin with workshops and training to share the understanding of the management practices and the associated measures to assure the practices are used effectively. It will also involve work assisting maintenance managers and administrators to assure the practices agreed on can be effectively used.

Deliverables

1. Documentation of major maintenance management practices

2. Associated measures

3. Asset onboarding procedures

Budget

Phase	Maintenance Practices	Admin Kristina M Ward $141 Hrs		SME1 Jack T Geisenhoff $247 Hrs		SME2 Rajan Jha $113 Hrs		Total Hours	Total Labor	Expenses 0%	Total Dollars
1	Implementation P/S for Plants & Pump Stations	0	$0.00	110	$27,170.00	0	$0.00	110	$27,170.00	$3,000.00	$30,170.00
2	Development Asset Managment Program	0	$0.00	116	$28,652.00	64	$7,232.00	180	$35,884.00	$3,950.00	$39,834.00
3	Assistance Maintenance Practices	8	$1,128.00	96	$23,712.00	0	$0.00	104	$24,840.00	$4,200.00	$29,040.00
4	Project Management	16	$2,256.00	0	$0.00	0	$0.00	16	$2,256.00	$0.00	$2,256.00
	Total Project Hours	24		322		64		410			
	Total Project Dollars		$3,384.00		$79,534.00		$7,232.00		$90,150.00	$11,150.00	$101,300.00

IMPROVE MANAGER SKILLS AND EFFECTIVENESS

ECWA managers will be provided with the tools to manage performance of their staff and area. Metrics and Key Performance Indicators will be implemented to allow managers to understand where additional investigation, work, and improved performance is needed. Managers will also be trained on the workflows on deviations from expected performance, planning and scheduling of work, and staff performance improvements.

The output of this task will also be used to train future managers and maintain operational consistency.

Phase 1 Leadership Workshop

We will conduct a four-hour workshop with ECWA leadership to define the objectives for the operating groups and document how they support the goals of the organization.

Five groups will be identified including line maintenance, operations, maintenance, meter shop, and information technology (IT). The managers in attendance at each group will be identified. A member of the leadership team will also be identified to kick off each of the five groups.

We will identify the communication messages that will be shared with each of the five manager groups. The messages will include at a minimum the objectives for each group, the relationship to ECWA objectives, and expected outcomes for each of the managers.

The messages developed above will be placed in a scripted communication plan. The communication plan will be used with each of the manager training sessions and will be available to train future managers.

Deliverables

1. The five groups, managers, and leadership team member who will be participating in the training.
2. Documented operational objectives and priorities for each of the groups.
3. Scripted communication plan.

Phase 2 Manager Workshops

A separate four-hour workshop will be conducted with each of the 5 manager groups and a member of the leadership team. The documented operational objectives and priorities for each of the groups identified in Phase 1 (Leadership Workshop) will be reviewed. We will discuss specific work activities that will need to be completed to achieve those objectives. A list of work activities will be developed.

Deliverables

1. List of work activities to achieve operational objectives

Phase 3 Work Practices and Reporting Review

We will document the work practices for each of the five groups identified in the previous tasks. Additionally, we will identify:

- Events that require management oversight and steps to resolve the issue
- Exceptions to expected results (such as work orders that take significantly longer than expected to complete)
- Changes to past practices
- Other

We will document the specific data sources and the associated technology systems that supply the data. We will define the specific data that will be provided to managers and the normal ranges of operations and the exceptions that will require management activity. We will also document the staff that will need to be involved in the resolution of any events or exceptions that occur. This step will also identify the expected outcomes as they are resolved. Finally, we will document the reports and key performance indicators required for each step in the work practice.

Deliverables

1. Documented work practices

2. Expected outcomes of management practices

3. Required data and reports to identify issues and report performance

Phase 4 On the Job Support and Work Practice and Reporting Refinement.

We will participate with ECWA managers in daily operations. We will refine work practices and the data sets used for daily management. We will assure that these changes continue to support the operational objective of ECWA. We will provide support to refine management meetings with staff.

Deliverables

1. Updates to:

    a. Documented work practices

    b. Expected outcomes of management practices

    c. Required data and reports to identify issues and report performance

Phase 5 Follow-up with ECWA Leadership

We will update leadership on the progress of each of the management groups. We will report out on Manager performance, needed training, issues that need to be addressed, and any additional data and reporting needs.

Deliverable

1. Updates and additional requirements to leadership

Budget

Manager Skills and Practice Improvement

Phase		PIC Craig E Yokopenic $373 Hrs	PIC $	Admin Kristina M Ward $141 Hrs	Admin $	SME1 Jack T Geisenhoff $247 Hrs	SME1 $	SME2 Rajan Jha $113 Hrs	SME2 $	Total Hours	Total Labor	Expenses 0%	Total Dollars
1	Leadership Workshop	9	$3,357.00	8	$1,128.00	10	$2,470.00	0	$0.00	27	$6,955.00	$1,560.00	$8,515.00
2	Manager Workshops	30	$11,190.00	10	$1,410.00	46	$11,362.00	16	$1,808.00	102	$25,770.00	$7,120.00	$32,890.00
3	Work Practice and Reporting Review	24	$8,952.00	30	$4,230.00	40	$9,880.00	40	$4,520.00	134	$27,582.00	$0.00	$27,582.00
4	On the Job Support and Work Practice and Reporting Refinement	12	$4,476.00	16	$2,256.00	140	$34,580.00	0	$0.00	168	$41,312.00	$4,680.00	$45,992.00
5	Follow up with ECWA Leadership	8	$2,984.00	2	$282.00	4	$988.00	0	$0.00	14	$4,254.00	$1,000.00	$5,254.00
6	Project Management	0	$0.00	32	$4,512.00	0	$0.00	0	$0.00	32	$4,512.00	$0.00	$4,512.00
	Total Project Hours	83		98		240		56		477			
	Total Project Dollars		$30,959.00		$13,818.00		$59,280.00		$6,328.00		$110,385.00	$14,360.00	$124,745.00

IBM SYSTEM REPLACEMENT PLAN

Following the development of the RFPs for the ERP System and the Customer Service and Billing systems, the functions that will be included in the two (or more) products will be defined. Vendors will propose solutions to meet the requirement and a variety of functions and modules will be available. Upon selection of the two systems, the functions that will be migrated from the IBM Power Series system under RFP 16 will be known.

Phase 2 System Identification

A list will be developed containing all the functions that are currently provided by the IBM Power System that will not be provided in the existing and planned system. This list will be present in a facilitated workshop to gather information on the size and complexity of each system and to identify the user community associated with each system.

Phase 3 List of Systems, Modules, and Applications

A second workshop will be conducted to present grouping of the systems and functions into packages that can provide the functions in one of three ways;

- A commercial off the shelf solution
- An add-on or module to an existing software package
- An in-house solution built from existing infrastructure

This workshop will group functions and systems into packages for procurement, for addition into existing systems and into development.

Phase 4 System Replacement Plan

A plan will be developed detailing the expected costs and schedule to implement the packages of software and modules. The plan will reflect the ERP and Billing system implementation schedule and any precursor infrastructure required to support software and modules. The plan will identify if long term support of the current IBM Power Series system is required, and if a temporary hosting review is needed.

Following the acceptance of the plan, projects and budgets will be initiated to complete the system migration.

Deliverables

1. IBM System List
2. List of Software Packages, Modules and Applications for procurement and Development
3. System Replacement Plan including Schedule and Cashflow

Outcomes

1. Retirement of the current IBM System hardware and shifting of long term IBM hardware maintenance, IBM software maintenance costs and Hi-Tech support costs to Hosted, Internal and other COTS warranties.
2. Replacement of old functions and systems.
3. Increased flexibility and functionality of new COTS applications.
4. Budget for IT Investments to prevent increasing IBM HW/SW maintenance costs

Budget

Phase	ECWA Advance Phase 2	PM Philip Gaberdiel $311 Hrs	$	Admin Marion L Freymann $124 Hrs	$	SME1 Jeffrey Coulson $250 Hrs	$	SME2 Robert Reilly $223 Hrs	$	Total Hours	Total Labor	Expenses	Total Dollars
												0%	
1	Project Management	40	$12,440.00	0	$0.00	0	$0.00	0	$0.00	40	$12,440.00	$0.00	$12,440.00
2	IBM System List Workshop	0	$0.00	2	$248.00	24	$6,000.00	24	$5,352.00	50	$11,600.00	$1,765.00	$13,365.00
3	List of Systems, Modules and Applications and Workshop	0	$0.00	8	$992.00	24	$6,000.00	24	$5,352.00	56	$12,344.00	$1,830.00	$14,174.00
4	IBM Replacement Plan	0	$0.00	8	$992.00	16	$4,000.00	14	$3,122.00	38	$8,114.00	$1,830.00	$9,944.00
	Total Project Hours	40		18		64		62		184			
	Total Project Dollars		$12,440.00		$2,232.00		$16,000.00		$13,826.00		$44,498.00	$5,425.00	$49,923.00

CITYWORKS IMPLEMENTATION AT THE PLANTS AND PUMP STATIONS

Building upon the work completed to utilize Cityworks for Line Maintenance, this task will implement Cityworks for the two plants, the pump stations and the tanks (Plants and PS). This task includes Maintenance Task Development, system configuration, testing and training for staff operating and maintaining the Plants and PS.

Following the implementation at the Plants and PS, an optimization of Cityworks Reporting, Planning/Scheduling, Data Management and Presentation and practices for all areas, including Line Maintenance, Plants and PS.

Phases 1, 2, 3, 4, 5, 6 Plants and Pump Station Implementation

Assets and maintenance practices will be implemented in the system for the Plants and PS. The asset data collected during Phase 1 will be loaded into the system. The SOPs developed by Wendell will be utilized to develop the Preventative Maintenance, Predictive Maintenance and Corrective Maintenance tasks for the assets.

If the SOPs do not provide all the information required to implement the maintenance program, EMA will identify these gaps and will provide a plan to gather the information, develop the program, present the information and configure the system. At this time standard reports will be developed and implemented. As the system is utilized and the optimization activities occur, updates and additional reports will be developed and tested.

When all the Asset and Maintenance Program data is compiled, the system will be fully configured and tested internally before User Acceptance Testing and Training.

Phases 7, 8, 9, 10 plants and Pump Station Testing and Training

When the system and assets are configured and available to all users at the Plants and Service Center, system testing and training will be completed.

A User Acceptance Testing plan will be developed to test the functionality of the configuration against expected results. This testing will be conducted by EMA, Operations and Maintenance Staff.

Training Materials for specific groups of users will be developed to cover operations, trades, administration, supervisor and manager functions within Cityworks. These materials will be circulated to Managers, Supervisors, IT and HR staff for review and comments and a workshop will be held to discuss and updates and changes. Following this, training sessions will be scheduled to cover all staff, shifts and functions needed for the Plants and PS. The training is modular, and staff can complete a general training or overview in one session and receive training in a specific function or task in another session. This provides flexibility for supervisors and managers in scheduling staff.

Phases 11, 12, 13, 14 Cityworks System Optimization

With Cityworks in place at Line Maintenance, the plants, pump station, and tanks, a review of high level functions and tasks in Cityworks will be undertaken to determine how to utilize the functions of the system for management decisions. This review will include reporting, performance, asset management calculations, display optimization, and data management.

The Gap Analysis will identify what can be changed and improved and will require interviews from key users, staff, the Cityworks Administrator, and management resources from across the Authority.

The analysis will be presented in a workshop and each gap and expected cost will be discussed to gain consensus on the benefits of implementing improvements, agreement on the priority of implementing changes and a methodology of implementing these functions. This will result in improvements falling into four areas:

- Provide a benefit and will be implemented immediately under the Phase 2 funding

- Provide a benefit and will be implemented internally through the ECWA Cityworks Administrator

- Provide a benefit but are of a sufficient scope and effort that a project and budget is required to complete

- Do not provide a significant benefit and will not be pursued

The items that will be implemented will be scoped and scheduled and will be completed in this phase while new projects will be identified for the IT Budget.

Deliverables

1. Cityworks Plants and PS Asset Information (Excel)

2. Cityworks Plants and PS Maintenance Practices (Excel)

3. Cityworks Configuration Report

4. Cityworks Testing Plan

5. Updates to the Cityworks Training Plan

6. Plant and PS Training Materials

7. Plant and PS Training Sessions

8. Cityworks Optimization Gap Analysis

9. Cityworks Optimization Project List and Plan

10. Optimization Implementation and Testing

11. IT Budget Items – Cityworks Projects

Outcomes

1. All work at the plants, pump stations and tanks is planned, scheduled and documented.

2. Assets are maintained according to a Maintenance Plan

3. Data is available for all Plant and PS maintenance activities

4. Cityworks Optimization tasks are identified, and a subset are implemented

Budget

Cityworks Phase 2

Phase	Task	PM — Philip Gaberdiel ($311) Hrs	$	Admin — Marion L Freymann ($124) Hrs	$	SME1 — Jeffrey Coulson ($250) Hrs	$	SME3 — Heather J. Haskell ($150) Hrs	$	SME4 — John Kidd ($120) Hrs	$	SME6 — Gayathri Gnanaselvam ($120) Hrs	$	SME7 — Craig Patterson ($185) Hrs	$	Total Hours	Total Labor	Expenses	Total Dollars
1	Project Management	40	$12,440.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	40	$12,440.00	$0.00	$12,440.00
2	Plant and PS Asset and Class Review and Finalization	0	$0.00	0	$0.00	0	$0.00	24	$3,600.00	24	$2,880.00	24	$2,880.00	16	$2,960.00	88	$12,320.00	$1,970.00	$14,290.00
3	Plant and PS Maintenance Practice Development from SOPs	0	$0.00	0	$0.00	0	$0.00	160	$24,000.00	80	$9,600.00	80	$9,600.00	0	$0.00	320	$43,200.00	$3,550.00	$46,750.00
4	SOP Gap Report	0	$0.00	8	$992.00	8	$2,000.00	16	$2,400.00	8	$960.00	8	$960.00	8	$1,480.00	56	$8,792.00	$0.00	$8,792.00
5	Maintance Practices Documentation (contingency to be determined)	0	$0.00	0	$0.00	0	$0.00	8	$1,200.00	40	$4,800.00	8	$960.00	40	$7,400.00	96	$14,360.00	$0.00	$14,360.00
6	System Loading and Configuration	0	$0.00	0	$0.00	8	$2,000.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	$4,605.00	$4,605.00
7	System Test Plan Development and Testing	0	$0.00	8	$992.00	16	$4,000.00	16	$2,400.00	16	$1,920.00	16	$1,920.00	16	$2,960.00	80	$12,192.00	$4,605.00	$16,797.00
8	Training Materials Development	0	$0.00	16	$1,984.00	0	$0.00	80	$12,000.00	24	$2,880.00	24	$2,880.00	0	$0.00	160	$23,744.00	$0.00	$23,744.00
9	Training Sessions	0	$0.00	0	$0.00	16	$4,000.00	120	$18,000.00	80	$9,600.00	80	$9,600.00	16	$2,960.00	280	$37,200.00	$9,470.00	$46,670.00
10	Documentation Development and Delivery	0	$0.00	0	$0.00	40	$10,000.00	16	$2,400.00	16	$1,920.00	16	$1,920.00	16	$2,960.00	80	$13,200.00	$0.00	$13,200.00
11	Optimization Gap Analysis	0	$0.00	8	$992.00	40	$10,000.00	16	$2,400.00	0	$0.00	0	$0.00	0	$0.00	80	$16,352.00	$1,970.00	$18,322.00
12	Optimization Workshops	0	$0.00	8	$992.00	24	$6,000.00	16	$2,400.00	0	$0.00	0	$0.00	16	$2,960.00	64	$13,392.00	$1,970.00	$15,362.00
13	Optimization Plan	0	$0.00	0	$0.00	16	$4,000.00	16	$2,400.00	0	$0.00	16	$2,960.00	0	$0.00	56	$11,360.00	$0.00	$11,360.00
14	Optimization Task Implementation	0	$0.00	0	$0.00	16	$4,000.00	64	$9,600.00	64	$7,680.00	64	$7,680.00	80	$14,800.00	288	$43,760.00	$6,220.00	$49,980.00
	Total Project Hours	40		48		168		552		352		320		208		1120			
	Total Project Dollars		$12,440.00		$5,952.00		$42,000.00		$82,800.00		$42,240.00		$38,400.00		$38,480.00		$262,312.00	$34,360.00	$296,672.00

EMA, INC.
ECWA Advance Phase 2 Consulting Services

ECWA PHASE 2 ADVANCE CIS/ERP RECOMMENDED PROJECT

The attached document is the updated recommended project for the Phase 2 Advance CIS/ERP Consulting Services, RFP 20180016. This document replaces the recommended project tasks provided in Section 4 of our proposal. The cost table replaces the cost table provided in Section 5 of our proposal.

CIS/ERP REQUIREMENTS DEFINITION

Phase 1 Mobilization

This task involves organizing the EMA project team and creating data requests for the utility. This data provides a foundation for understanding the utility's current CIS/ERP related business processes and business rules. Mobilization includes a full-day on-site workshop, finalizing the project plan with the utility, establishing the CIS/ERP Project Team, and coordinating kickoff with the Steering Team.

Key topics of the mobilization workshop will include project goals, measures of success, assumptions, constraints, roles and responsibilities, and the project schedule. EMA will update the project plan at the end of the workshop.

Deliverables

1. Data Request
2. Project Plan and Schedule
3. Project Team Roles and Responsibilities

Phase 2 Interviews & Requirements Gathering.

This task includes evaluating the previous data requests; conducting interviews (one-on-one or small group); and small group work sessions to review the documentation provided by the utility in preparation for the CIS/ERP project. EMA will use the information gathered from the interviews to help us understand the business rules, interfaces, reports, and other technical topics covered in the prepared materials.

Deliverables

1. Interviews and Workshops

Phase 3 Inventory and Review Existing Business Processes.

EMA will provide a business process template and outline for the Authority to inventory and document their existing business processes. EMA will review the business process inventory and documentation and assist with completing the documentation of cross-functional business process. We will then identify those unique to the Authority.

Deliverables

1. Business process Template
2. Review of existing business processes

Phase 4 Meter-To-Cash Leading Practices Review

EMA will facilitate a half day leading practices workshop on current technical and functional abilities of Commercial-Off-The-Shelf (COTS) CIS systems that the Authority may want to

include as requirements. This will include a review of how some of the latest capabilities may increase productivity and improve processes. This information will be used to enhance and refine functional and technical requirements.

- The workshop will include discussion opportunities for the project to provide the following:

    - Process efficiency gains

    - Productivity improvements

    - Enhanced customer service

- Identify additional desired functional requirements,

- Create requirements for the desired new system and related practices, not simply to replace the legacy system and practices.

Deliverables

1. Leading practices workshop

Phase 5 Prepare/Review/Update Functional and Technical Requirements

This task involves preparing, presenting, and obtaining feedback on key functional and technical requirements. The functional requirements will list both critical business process requirements that focus on the utility's uniqueness as well as basic requirements that are common functionality of most CIS/ERP. The technical requirements will capture the utility's security, infrastructure and hardware requirements, among others.

Deliverables

1. Functional Requirements

2. Technical Requirements

Phase 6 Interface Requirements.

EMA will gather requirements for the integration of the ERP/CIS system with other utility systems. This includes identifying all current interfaces and desired future interfaces. The requirements list the type of interface, if it is one-way or two-way, and the desired functionality of that interface.

Deliverables

1. Interface Requirements

Phase 7 Conduct Drill-Down Sessions and Detailed Requirements.

EMA will identify missing elements required to finalize the requirements document through drill-down sessions with Subject Matter Experts (SMEs). Typical areas to be reviewed include technical architecture, interfaces definition, reports definition, training plan requirements, and functional requirements. The Authority will validate the detailed requirements and other information identified during drill-down sessions. The CIS/ERP training requirements will be provided as an attachment to the RFP.

Deliverables

1. Workshops
2. Final Interfaces Definition document
3. Final Reports Definition document
4. Draft Training Plan
5. Final Functional and Technical Requirements

Phase 8 Phase 1 Project Management.

This task includes managing the budget, scope, EMA resources, and schedule. It also includes providing ongoing project communication, invoices, progress reports, and risk review during the Requirements Phase. A single project manager will be provided to manage all ongoing projects and supplemented with a track lead or project coordinator.

Deliverables

1. Overall Project Management
2. Monthly Progress Reports

Assumptions

In preparing this proposal, we made the following assumptions:

- The Authority has already conducted high-level demonstrations with viable CIS and ERP vendors.
- The Authority desires substantial involvement during this project, has highly skilled staff, and is committed to ensuring key staff availability to support their involvement. The utility will ensure personnel will participate in workshops, interviews, meetings, and decisions in all phases of the project. To support this, the roles of Project Sponsor, Steering Team, Project Manager and a cross-functional Project Team will be defined.
- Customer Self Service, Electronic Bill Presentment and Payment (EBPP) and Document Management are not included
- Assumes a hosted solution
- The table on the following page outlines example roles, typical duties, and estimated time commitment by phase:

Table 1: Phases I. Example Project Roles and Utility Staff Time Commitment

Roles	Description	Responsibilities	Phase I: Estimated Time Commitment
Project Sponsor	Executive Team Member	• Champion the project • Provide overall project direction and executive leadership • Help create and carryout the project vision • Help to define and achieve project goals • Ensure necessary funding is available	10%
Project Manager	Project Manager	• Coordinate and manage overall project related activities, schedule and budget • Develop and focus the implementation team • Prioritize team activities • Interface with other projects • Ensure risks are communicated • Coordinate with staff, EMA, and vendors • Work issues as they emerge	25%
Steering Team	Typically the Project Sponsor, plus Executive Leadership	• Champion the project • Provide overall project direction and leadership • Ensure plan gets carried out and regularly updated • Stakeholder communications • Revisit project risks on a monthly basis • Resolve issues escalated to them	1 - 5%
Requirements Gathering Team	Those who have day-to-day responsibility for finance, accounting, HR, Payroll, and meter-to-pay functions	• Communicate • Actively participate in project activities and workshops • Gather information and provide input as requested • Stay focused on goals	30 - 40%
Subject Matter Experts	Experts in supporting functions of finance, accounting, payroll, and meter-to-pay	• Participate in selected interviews and workshops • Gather information and provide input as requested • Review and comment as requested • Validate desired and configured functionality	1 - 5% as needed
Information Technology	Technical admin staff responsible for ERP/CIS and related interfaces	• Provide input on technology requirements and standards • Provide data definitions and conversion assistance. • Interface with other projects/ systems	5 - 10%

Budget

The total project costs for Phase 1 are estimated to be $459,943. This is a fixed firm price contract. EMA will not exceed the total amount stated without prior notice and written approval by the utility. Cost estimates include expenses as incurred (no markup). The following table presents the proposed costs for this phase.

CIS/ERP Detailed Requirements	PIC Craig E Yokopenic $373	PM Robert Reilly $223	Admin Marion L Freymann $125	SME1 William Rivers $253	SME2 Sandip Basu $240	SME3 Lynne Powers $319	Total Hours	Total Labor	Total Expenses	Total Dollars
Phase										
1 Mobilization	16	30	16	24	24	16	126	$31,594.00	$7,500.00	$39,094.00
2 Interviews and Requirements Gathering	16	97	16	185	141		455	$110,244.00	$16,500.00	$126,744.00
3 Inventory and Review existing Business Processes		40	24	40	40		144	$31,640.00	$4,500.00	$36,140.00
4 M2C Leading Practices Review	8	16	16	30	30	16	116	$28,446.00	$7,500.00	$35,946.00
5 Prepare/Review/Update Functional and Technical Requirements	16	110	32	105	105		368	$86,263.00	$6,000.00	$92,263.00
6 Interface Requirements		80	8	24	24		136	$30,672.00	$6,000.00	$36,672.00
7 Conduct Drill-down Sessions and Detailed Requirements		42	24	72	56	16	210	$49,126.00	$9,000.00	$58,126.00
8 Project Management	16	130					146	$34,958.00	$0.00	$34,958.00
Total Project Hours	72	545	136	480	420	48	1701			
Total Project Dollars	$26,856.00	$121,535.00	$17,000.00	$121,440.00	$100,800.00	$15,312.00		$402,943.00	$57,000.00	$459,943.00

PROFESSIONAL SERVICES CONTRACT

AGREEMENT made this _____ day of _____, 20___, by and between:

ERIE COUNTY WATER AUTHORITY
295 Main Street, Room 350
Buffalo, New York 14203

hereinafter referred to as the "Authority", and

EMA, Inc.
2355 Highway 36 West, Suite 200
St. Paul, MN 55113

hereinafter referred to as "Consultant".

   WHEREAS, the Authority desires to contract with the Consultant to render professional services upon the terms and for the consideration hereinafter stated;

   WHEREAS, the Consultant represents that it is properly qualified to render such services; and

   WHEREAS, the parties desire to set forth herein the terms and conditions under which the said professional services will be furnished;

   NOW, THEREFORE, in consideration of mutual promises herein set forth, the parties agree as follows:

1.   QUALIFICATION OF CONSULTANT:

The Consultant shall perform its services under this agreement in a skillful and competent manner in accordance with the prevailing standards of the consulting profession. The Consultant will be responsible to the Authority for errors or omissions in the performance of its services and failure to perform thereof.

2.   SCOPE OF SERVICES:

Listed below is a synopsis of the Scope of Services. Details of the level of effort for each Track/Phase/Task and associated cost are shown in Consultant's proposal, attached hereto as Exhibit "A", dated June 4, 2018 and incorporated by reference.

1) Review existing processes and integrations in the Accounting, Customer Service, Human Resources, Meter Shop, Cash Management and Risk Management Departments. Specific processes will necessarily include, but may not be limited to the following:

ERP	CIS
General Ledger/Chart of Accounts	Billing
Budget Preparation	Customer Contact History
Accounts Payable	Application Tracking
Fixed Assets	Collections & Payment Arrangements
Purchasing	Work Order Generation & Tracking
Cash Management	Tickler File Activities
Miscellaneous Billing & Accounts Receivable	Letter Generation
Payroll & Timekeeping	**MISCELLANEOUS**
Human Resources	Document Management
	Inventory Management
	Risk Management & Claims Processing

2) Document system requirements necessary to maintain key functions as well as enhance current processes where possible. Recommend process changes to conform with best practices where applicable. A detailed needs assessment and recommendations report should be finalized within six months of the agreement date.

3) Assist in the software selection process, including the preparation of a Request for Qualifications if necessary. Recommend software vendor(s) with products that meet defined requirements. Schedule product demonstrations of recommended software. All recommended solutions must include query and report writing components.

4) Assist in contract negotiations with the selected vendors.

5) If requested, on an hourly fee basis, provide implementation support to include data-conversion, development and execution of the test plan, implementation scheduling, and training.

3.   PAYMENT FOR SERVICES:

A.   For services described under Section 2, Scope of Services, the Authority shall pay the Consultant the fees and direct non-salary expenses outlined in Exhibit 'A'. Itemized invoices shall be submitted for payment monthly. The Roster shall be amended as required to accurately reflect personnel changes of the Classification titles of individuals performing work under this Contract. Amending the Roster shall not be considered an alteration of the contract. Consultant shall provide an amended Roster within two (2) weeks of Authority's request for an Amended Roster.

Classification	Hourly Rate
Principal-in-Charge	$373
Program Manager	$223
Subject Matter Expert 1	$253
Subject Matter Expert 2	$240
Subject Matter Expert 3	$319
Project Administrator	$125

B.   Consultant anticipates that this project can be completed in approximately 30 months, but will confirm and finalize the project schedule with the Authority staff during project initiation.

The amount of compensation and to be paid to Consultant for all services under this Agreement shall not exceed **Four Hundred Fifty-Nine Thousand Nine Hundred Forty-Three Dollars and Zero Cents ($459,943.00)** referred to hereafter as the Not To Exceed Amount ("NTE"). If implementation support is required, the Consultant will supply the Authority with an estimate based on the Consultant's hourly billing rates. Reimbursable Expenses are included in the NTE.

C.   Direct non-salary expenses shall include airfare, lodging, and meals for EMA employees only while traveling.

D.   The Authority shall reimburse the Consultant for actual direct non-salary expenses incurred by the Consultant when engaged directly in Authority work. Any direct non-salary expenses submitted for reimbursement which has not been pre-approved, or requested in advance by the Authority will be reimbursed at the sole discretion of the Authority.

E.   The Authority shall reimburse the Consultant for actual subcontractor and hardware/software expenses incurred by the Consultant when engaged directly in Authority work. Any subcontractor and hardware/software expenses submitted for reimbursement which has not been pre-approved, or requested in advance by the Authority will be reimbursed at the sole discretion of the Authority. The Authority reserves the right to contract directly with proposed subcontractors and procure hardware and software if,

after considering procurement procedures and warranty issues, it is in the Authority's best interest to do so.

F. The Authority shall reimburse travel expenses to the Consultant in accordance with the New York State Office of the State Comptroller's Travel Guidelines (available on their website at http://www.osc.state.ny.us/agencies/travel/travel.htm) and at the per diem rates website at: http://www.gsa.gov/ under Travel Resources, Per-Diem Rates. Allowable reimbursement for commercial airline travel shall include the actual expense or cost for the least expensive logical fare via the most direct route, or a reasonable alternative route if it results in lower fare.

G. No mark-up shall be allowed on any direct non-salary expenses and subcontractor costs submitted for reimbursement.

4. **SUBCONTRACT AND ASSIGNMENT:** The Consultant may not subcontract or delegate any of the work, services, and/or other obligations of the Consultant without the express written consent of the Authority. The Authority and the Consultant bind themselves and their successors, administrators and assigns to the terms of this Agreement. The Consultant shall not assign, sublet or transfer its interest in the Agreement without the written consent of the Authority.

5. **AMENDMENTS:** No modification or variation from the terms of this Agreement shall be effective unless it is in writing and authorized by a resolution of the Board of Commissioners of the Authority and signed by all parties.

6. **RIGHT TO TERMINATE:** The Authority reserves the right to terminate the Consultant's services at any time, without cause, based on thirty (30) days written notice. Consultant shall not be entitled to lost profit and shall perform only such services, after notification of termination, as the Authority directs.

7. **INDEMNIFICATION:** The Consultant shall indemnify the Authority against any and all claims arising from the services performed by the Consultant herein and shall defend and hold harmless the Authority from and against all claims, suits, actions, costs, counsel fees, expenses, damages, judgments or decrees based upon or arising out of damage to property or injury to persons or other tortious conduct caused or contributed to it by the Consultant or anyone under its direction or control or on its behalf in the course of its performance under this Agreement. The Consultant further agrees to indemnify, defend and hold harmless the Authority from any and all claims in reference to the services performed by the Consultant hereunder which may infringe on a patent, copyright, trade secret or other proprietary right of any third party.

8. **CONFIDENTIAL INFORMATION:** To assist the Consultant in the performance of this Agreement, the Authority may provide the Consultant with confidential information including, but not limited to information relative to the services to be performed. All information received by the Consultant in any fashion and under any conditions resulting from the rendering of the services in consideration of this agreement, is considered

confidential. The Consultant shall hold in confidence and not disclose to any person or any entity, any information regarding information learned during the performing of services including but not limited to information relative to the services to be performed.

The Consultant shall use at least the same degree of care to protect and prevent unauthorized disclosure of any confidential information as it would use to protect and prevent unauthorized disclosure of its own proprietary information. The Consultant shall use confidential information only in the performance of this Agreement. No other use of the confidential information whether for the consultant's benefit or for the benefit of others shall be permitted.

In no event is the Consultant authorized to disclose confidential information without the prior written approval of the Authority. The terms of this paragraph shall be binding during and subsequent to the termination of this agreement.

9. **INSURANCE**: The Consultant shall secure and maintain such insurance as will protect itself from claims under the Workers' Compensation Act; claims for damages because of bodily injury, including personal injury, sickness or disease, or death of any of its employees or of any person other than its employees; and from claims for damages because of injury to or destruction of property including loss of use resulting there from in the amounts indicated on Exhibit "A". The Consultant shall provide and maintain insurance that will provide coverage for claims arising out of the negligent performance of its services. The Consultant shall provide Certificates of Insurance certifying the coverage required by this provision.

10. **COPYRIGHTS, TRADE MARKS, AND LICENSING**: All materials produced under this Agreement, whether produced by the Consultant alone or with others, and whether produced during regular working hours, shall be considered work made for hire and the property of the Authority. The Consultant shall, during and subsequent to the terms of this Agreement, assign to the Authority, without further consideration, all right, title and interest in all material produced under this Agreement. All material produced under this Agreement shall be and remain the property of the Authority whether or not registered.

In performing work under this agreement, the Consultant may be granted access to the Authority's GIS data, documents, and other information. The Consultant understands and agrees that the use of such data, documentation and information shall be treated as confidential information and the Consultant shall abide by the terms and conditions of any confidentiality and copyright leasing agreements (attached as Exhibit "B").

11. **NEW YORK LAW AND JURISDICTION**: Notwithstanding any other provision of this Agreement, any dispute concerning any question of fact or law arising under this Agreement which is not disposed of by agreement between the Consultant and the Authority shall be governed, interpreted and decided by a Court of competent jurisdiction of the State of New York in accordance with the laws of the State of New York.

12. **CONFLICTS OF INTEREST:** The Consultant represents that it has advised the Authority in writing prior to the date of signing this Agreement of any relationships with third parties, including competitors of the Authority, which would present a conflict of interest with the rendering of the services, or which would prevent the Consultant from carrying out the terms of this Agreement or which would present a significant opportunity for the disclosure of confidential information. The Consultant will advise the Authority of any such relationships that arise during the term of this Agreement. The Authority shall then have the option to terminate the Agreement without further liability of the Consultant, except to pay for services actually rendered.

13. **ADDITIONAL CONDITIONS:** The Consultant and the Authority acknowledge that there may be additional conditions, terms and provisions which shall apply specifically to the services to be performed. The parties agree to negotiate in good faith to agree upon such additional terms.

14. **ENTIRE AGREEMENT:** This Agreement constitutes the entire understanding of the parties and no representations or agreements, oral or written, made prior to its execution shall vary or modify the terms herein. This Agreement supersedes all prior contemporaneous communications, representations, or agreements, whether oral or written with respect to the subject matter hereof and has been induced by no representations, statements or agreements other than those herein expressed. No agreement hereafter made between the parties shall be binding on either party unless reduced to writing and signed by an authorized officer of the party sought to be bound thereby.

15. **INDEPENDENT STATUS:** Nothing contained in the Agreement shall be construed to render either the Authority or the Consultant a partner, employee or agent of the other, nor shall either party have authority to bind the other in any manner, other than as set forth in this Agreement, it being intended that the Consultant shall remain an independent contractor responsible for its own actions. The Consultant is retained by the Authority only for the purpose and to the extent set forth in this Agreement.

The Consultant is free to choose the aggregate number of hours worked and substantially all the scheduling of such hours as it shall see fit at its discretion within the limitations set forth hereinbefore in Paragraph 2.

Neither the Consultant nor its employees shall be considered under the provisions of this Agreement or otherwise as having an employee, servant or agency status or as being entitled to participate in any plans, arrangements or distributions of the Authority.

In providing the services under this Agreement, the Consultant represents and warrants that it has complied with all applicable federal, state and local laws particularly with respect to licenses, withholdings, reporting and payment of taxes. The Consultant agrees to furnish copies of documentation to the Authority evidencing its compliance with such laws. The Consultant further represents and warrants that any income accruing to the Consultant and its employees from the Agreement shall be reported as such to the appropriate taxation authorities.

16. **COMPLIANCE:** The Consultant agrees that the Agreement herein shall comply with and governed by the provisions of Sections 2875, 2876, and 2878 of the Public Authorities Law of the State of New York. The Consultant further affirms under the penalties of perjury that there was no collusion in the proposal submitted herein to the Authority which forms the basis of the within Agreement.

17. **GRATUITIES:** The Consultant prohibits its employees from using their positions for personal financial gain, or from accepting any personal advantage from anyone under circumstance which might reasonably be interpreted as an attempt to influence the recipients in the conduct of their official duties. The Consultant or its employees shall not, under circumstances which might be reasonably interpreted as an attempt to influence the recipients in the conduct of their duties, extend any gratuity or special favor to employees of the Authority.

18. **NOTICE:** Any notices required by this Agreement or otherwise shall be delivered by United States Postal Service or personal delivery upon the addresses hereinbefore stated. Any change in such addresses shall be required to be in writing to the other party and acknowledged as such.

19. **SEVERABILITY:** If any provision of this agreement shall be held invalid or unenforceable, in whole or in part, such provision shall be modified to the minimum extent necessary to make it valid and enforceable, and the validity and enforceability of all other provisions of this agreement shall not be affected thereafter.

20. **TERMINATION:** The Authority reserves the right to terminate this contract in the event it is found that the Certification filed by the Consultant in accordance with New York State Finance Law Section139-k was intentionally false or intentionally incomplete. Upon such finding, the Authority may exercise its termination right by providing written notification to the Consultant in accordance with the written notification terms of this contract.

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ERIE COUNTY WATER AUTHORITY

By: _____
       Jerome D. Schad, Esq., Chairman

EMA, Inc.

By: _____
       Craig Yokopenic, Executive Vice President

STATE OF NEW YORK)
COUNTY OF ERIE   )ss:

On the _____ day of _____, in the year 20___, before me personally came Jerome D. Schad, Esq., to me known, who, being by me duly sworn, did depose and say that he resides in the Town of Amherst, New York, that he is the Chairman of the Corporation described in the above instrument; and that he signed his name thereto by order of the Board of Directors of said Corporation.

                                   _____
                                   Notary Public

STATE OF NEW YORK)
COUNTY OF ERIE   ) ss:

On the _____ day of _____, in the year 20___, before me personally came Craig Yokopenic, to me known, who, being by me duly sworn, did depose and say that he resides in _____, that he is the Executive Vice President of the
                     (City and State)
Corporation described in the above instrument; and that he signed his name thereto by order of the Board of Directors of said Corporation.

                                   _____
                                   Notary Public