Memorandum
Public Works Department

RI ROCK ISLAND ILLINOIS

To: City Manager
Subject: Wastewater Treatment Facility Electronic Operations and Maintenance Manual Project 2624
Date: October 31, 2012
Number: 2012-243

Attached is a proposed contract amendment to the agreement with Symbiont for additional engineering services related to the proposed wet weather treatment system at the Mill Street wastewater treatment facility.

The Wastewater Treatment Facility Project currently under construction was designed by Symbiont and includes a new wet weather treatment system, improvements to the existing wastewater treatment plant and a new process control system. In addition, numerous other improvements are being made which consists of upgrading field instrumentation, control panels, computer hardware and software.

During the design phase of this project, it was determined that the design team would develop an electronic operations and maintenance (O&M) manual during the construction phase of this project. This amendment is to allow Symbiont to coordinate and create an updated O&M manual for the constructed upgrades.

Symbiont proposes to provide these additional engineering services at their standard hourly rates at an estimated cost of $473,800.

Recommendation

The Public Works Department recommends that the City Council approve the amendment to Symbiont's contract at an additional cost of $473,800 and that the City Manager be authorized to sign the amendment on behalf of the City of Rock Island.

Submitted by: Robert T. Hawes, P.E., Assistant City Manager/Public Works Director
Michael J. Kane, P.E., City Engineer

Approved by: Thomas Thomas, City Manager

Mr. Robert Hawes, P.E.   October 19, 2012
Assistant City Manager/Public Works Director
City of Rock Island
1309 Mill Street
Rock Island, IL 61201

RE: **Electronic Operations and Maintenance Manual**
        Wet Weather Treatment System
        City of Rock Island, Illinois
        Symbiont Proposal No. 32464

Dear Mr. Hawes:

Symbiont is pleased to submit this proposal to the City of Rock Island (City) Public Works Department for the development and implementation of an electronic operation and maintenance manual system associated with the Wet Weather Treatment System (WWTS) project.

PROJECT UNDERSTANDING AND APPROACH

Symbiont completed detailed design of the Wet Weather Treatment System project which included a new wet weather treatment system, existing wastewater treatment plant improvements, a new outfall sewer, a new utilities maintenance garage, a new process control system, and miscellaneous improvements. The City opened bids for the project on May 10, 2011 and has entered into an agreement with the low, responsive bidder, Civil Constructors, for the completion of the work. Site construction activities began in August 2011, and the project has a substantial completion schedule of 870 days from award of contract with an additional 60 days for final completion, approximately March 2014.

During detailed design it was determined that the design team would develop an electronic operations and maintenance (O&M) manual during the construction phase of the project. A workshop was held with City staff on August 29, 2012 to review the proposed features, scope, and interface with existing City asset management software of the proposed wet weather treatment system O&M manual. The electronic O&M manual is a separate system from the control system screens and programming but we plan to utilize many of the control system operational screens to effectively and efficiently develop a comprehensive information storage and retrieval tool for City staff.

Symbiont proposes to complete the electronic O&M manual development and integration as an amendment to the on-going engineering services during construction contract Symbiont has with the City. The following paragraphs outline the specific tasks to be performed to complete the O&M manual system. As previously discussed, Symbiont will also submit a separate proposal to the City for WWTS startup and training services.

M:\L1-A1-32464-268
© 2012 Symbiont

Trusted For Good Reason.

SCOPE OF WORK

The following scope of work outlines the tasks deemed necessary to accomplish the electronic O&M manual system and integrate the information into the City's electronic infrastructure. The scope of work is based on the meeting held with City staff on August 29, 2012 and subsequent follow up conversations.
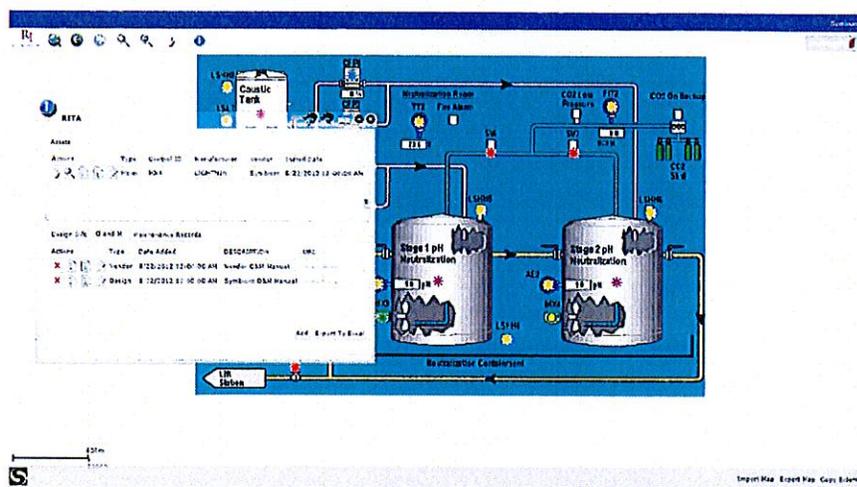
Task 1 – O&M Manual Graphical Interface Development

Human-Machine Interface (HMI) System to Access O&M Information

Symbiont will utilize the graphical overview screens developed as part of the wet weather treatment system controls programming tasks as the starting basis for organizing relevant background information regarding existing and new wastewater treatment system assets. At the August 29, 2012 meeting with City personnel, it was requested that the new electronic O&M manual reflect not only the new wet weather equipment system but be built such that the City can insert background information for existing assets. As such, we have prepared the attached Table 1 which summarizes the proposed HMI screens for use with the O&M manual and the source of the screen development (use screens included in the programming task or develop new screens as part of this project scope).

As discussed with City staff during the drafting of this proposal, only the major or significant equipment components that are illustrated on the HMI screens will contain hyperlinks to the associated background information for the equipment. For example, manual valves will not be hyperlinked to additional information.

An example mock up of a typical HMI screen used for accessing the O&M information is shown below:

Task 2 – Reference Information Summaries for Identified Assets

Wet Weather Treatment System

There are multiple information sources associated with the new assets being supplied and installed as part of the wet weather treatment system improvements. Symbiont proposes to organize and integrate the following information items with the assets identified in the screen development effort in Task 1. This task concentrates on organizing the referenced information for inclusion into the electronic O&M.

Wet Weather Treatment System	
Asset Related Information Organized for Use in Operations Manual	**Information Source**
Equipment Manufacturer's O&M Information	Vendor O&M Manuals supplied as part of construction contract
Designer O&M Information	Developed by design team as part of this contract amendment (Task 3)
Design Drawings	Assembled using Construction Record Drawings
Photographs	Assembled using Construction Management Services documentation
Training Materials	Vendor supplied material as part of construction contract in addition to the separate material developed by design team as part of future startup/training services amendment

Existing City Wastewater System Related Assets

As noted in Table 1, there are several existing public works related assets that the City identified for inclusion into the electronic operations manual. It is our understanding that the operations manual HMI screens and menus for identifying the noted asset areas will be developed as part of the manual with the expectation that the City of Rock Island will undertake the efforts to retrieve and populate the database with the missing information. Symbiont will build the framework for the City to enter the information and provide training to the City for future development of this task. The following information is anticipated to be located and entered in to the operations manual by Rock Island:

Existing WWTP Equipment Not Part of Wet Weather Treatment System	
Asset Related Information Organized for Use in Operations Manual	**Proposed Information Source**
Manufacturer's O&M Information	Vendor O&M Manuals supplied as part of past construction contracts.
Designer O&M Information	Hard copies of past projects that need to be scanned into PDF or other format. Symbiont upgrades in 1998 are available for City use.
Design Drawings	Hard copies of past projects that need to be scanned into PDF or other format. Symbiont upgrades in 1998 are available for City use.
Photographs	City records, archives, and files at WWTP and Public Works.
Training Materials	Vendor supplied material as part of past construction contracts and are being used for maintenance activities need to be scanned into PDF format.
Maintenance Schedules	City staff need to enter maintenance information into City Works using vendor O&M manual information or past practices (see Task 5).

Task 3 – Organize Vendor Submitted O&M Manuals and Develop Designer Operations Manual Documents

Symbiont will prepare two different types of information for the wet weather treatment system. The first type of operations manual information will organize and coordinate the electronic vendor information provided as part of the construction project. The vendor manuals will have the recommended equipment maintenance requirements extracted from the overall manuals and summarized for inclusion into the maintenance management system for performing scheduled maintenance. The overall vendor manuals that include all of the operation, maintenance, diagrams and spare parts information will be organized electronically for reference in the electronic interface that uses the screen menus developed in task 1 and the interactive manual interface.

The second type of operations manual information will be prepared by Symbiont to summarize and illustrate the operational intent and background information from the design engineer's perspective that will supplement the vendor equipment information. The designer operations manual will include sections prepared by Symbiont for the systems installed or modified as part of the wet weather treatment improvements project. The proposed manual chapters are outlined below and include:

1. Introduction/Overview
2. WWTP/WWTS Screening
3. WWTP/WWTS Pumping

4.   WWTP Grit Handling
5.   WWTP Sludge Handling
6.   WWTS Treatment – Clarifiers, Splitter, Outfall, Samplers
7.   WWTS Sludge & Grit Handling
8.   WWTS Chemical Feed
9.   WWTS Building Facility Support Systems – HVAC, Plumbing, Fire Protection
10.   Storm Screening & Pumping and Effluent Pumping
11.   Biogas Handling, Boilers, Generator
12.   Electrical Systems
13.   SCADA System/Controls
14.   Safety Considerations
15.   Maintenance Schedules

The information that will be prepared and organized in the manual for each of these chapters and systems includes:

- process and facility descriptions

- safety considerations

- start-up plans

- normal operation / shutdown of process equipment or systems, and process and operational monitoring

- emergency or atypical operation of process equipment or systems

- HMI control and screen views for each of the systems

We will also compile information from process designers, our HMI / controls developer, and equipment manufactures and will include such information as process design criteria, operation and control system features, HMI screens and control settings along with control logic descriptions and programming settings.

Symbiont will compile all the designer operations manual documents noted above and prepare two (2) hard copies (to be delivered in a set of binders) that will supplement the vendor O&M hard copies provided as part of the construction contract. In addition, Symbiont will prepare and load the electronic version of the designer and vendor O&M manuals (PDF) into the electronic database for access using the HMI screens noted above in Task 1.

Task 4 – Interactive Operations and Maintenance Manual – GIS System Overview Development

An Interactive Operations and Maintenance (IOM) GIS based application will serve as the mechanism to operate the O&M manual and will utilize a browser based system that provides the intuitive means to access operation and maintenance related information. The

IOM GIS application will be designed to easily add and edit additional content as noted in Task 2 for existing public works assets and allow expansion for future systems.

Symbiont will develop the IOM interface elements based on input from the City regarding access locations, methods and number and types of personnel. The interface will be designed with an intuitive means to access the O&M information locally at the City's facilities or remotely, with the ability for the system to be expanded in the future. Symbiont will leverage its existing Silverlight™ based interface as the foundation for the new IOM system, with anticipated customizations to be performed to meet the requirements mutually agreed for this project. During the development phase, Symbiont will provide the City with opportunities to review system functionality and options allowing for the City to provide feedback regarding additional enhancements if necessary.

In coordination with the IOM interface, Symbiont will define the requirements of the IOM geodatabase which will serve as the GIS based repository for assets with WWTP based operation and maintenance needs. The database will be created using an enterprise level relational geodatabase, to allow for unlimited data storage and usage. This is the database for the City to populate information from past projects.

Symbiont will populate the geodatabase described in Task 2. Basic attribute information such as asset type, asset ID, manufacturer, vendor information will be populated for each unique asset within the geodatabase tables.

IOM will be implemented using a cloud-based infrastructure approach, which will require a cloud-based service subscription like Amazon© EC2, as well as the purchase of ESRI's ArcGIS Enterprise Standard Server, Microsoft SQL Server, and upgrades to Azteca's City Works™ Server software.

An Amazon© EC2 Cloud Server account will be purchased on behalf of the City of Rock Island, with the intention of transferring ownership during the implementation phase. An Amazon EC2 subscription allows users to create and utilize virtual server computers depending on their needs. The cost of the subscription is normally a monthly fee based on the computer usage, size, and configuration of the server created. Symbiont will assist the City of Rock Island by evaluating the server requirements, as well as purchasing, configuring, and installing ArcGIS Server, ArcGIS Desktop, and City Works™ Server software on the machine selected. In addition to software costs, included are costs associated with Symbiont using the Amazon EC2 server during the development phase for 1 year. Following implementation monthly fees associated with the Amazon EC2 account will become the responsibility of the City.

Based on feedback from the City, Symbiont will purchase for the City an additional 18 licenses of City Works, which will provide the City with a total of 30 licenses. Integration between City Works and the City of Rock Island IOM interface will require the City to purchase the City Works Work Order API, which is included in the software requirements.

The following table illustrates the software, hardware, and number of licenses included in the scope of work associated with this proposal.

IOM Software and Hardware Requirements				
Item No.	Vendor	Type	No. of Users	Software/Hardware Description
1	ESRI	Software	1	ArcGIS Server Enterprise Standard
2	Azteca	Software	18	City Works Server
3	Azteca	Software	1	City Works Work Order API
4	Microsoft	Software	5	SQL Standard (5 Cals)
5	Amazon	Hardware	1	EC2 Large Reserved (1Year)

For clarification purposes, we would also like to note that there will be ongoing annual user costs associated with the above noted software/hardware that will be borne by the City after the system is commissioned. Theses anticipated costs are outlined in the fee portion of this proposal.

Task 5 – Maintenance Scheduling Provisions for IOM to Interface with City Works™

Symbiont will design the IOM to have capability to schedule, view and record preventative maintenance activities, by leveraging and integrating the City of Rock Island's existing City Works™ asset management software with the new O&M system. The system will be integrated with the City of Rock Island's existing City Works™ asset management system (AMS) to allow for scheduling and tracking of preventative maintenance activities related to WWTP operations. Included in the scope of work is upgrading the City's existing City Works™ system to the next generation web based product to the cloud-based infrastructure provided in Task 4; implementing City Works™ AMS for the WWTP, and integration of the WWTP AMS with the IOM system. Powers Engineers, Inc., an Azteca business partner will provide services under Symbiont's contract related to the City's City Works™ AMS upgrade, and implementation of the WWTP AMS. A detailed scope of work of Powers Engineer's services is provided in their proposal attached hereto for reference. Upon implementation of the City Works™ WWTP AMS and City Works™ upgrade, Symbiont will customize the IOM to allow for viewing, and creation of new work orders within the IOM system. Custom reporting, administration and other advanced features will be completed by City Works™.

Symbiont will also review the recommended equipment maintenance requirements and schedules that are submitted by the different wet weather project vendors in their O&M manual submittals and organize the maintenance activities for input into the AMS by the City. Symbiont will work with the City and their maintenance management software provider, City Works, to establish the data format that will be consistent with transferring the vendor O&M information into a format that can be accessed and used by the City Works program.

Mr. Robert Hawes, P.E.
October 19, 2012
Page 8

SCHEDULE AND BUDGET

Symbiont proposes to perform the electronic Operations Manual development services described herein on a time and materials basis for a not to exceed amount of $473,800 as summarized below.

Task	Amount
Designer O&M with GIS Interface	$254,500
Server-Based City Works Upgrade	$36,300
City-Works Maintenance Management Module	$98,600
Software	$84,400
TOTAL	$473,800

To help clarify the scope of software and hardware costs included with the proposed electronic manual development, the table below summarizes the specific initial capital and ongoing maintenance costs for the different programs.

Vendor	Type	Description	Capital Costs	No. of Users	Annual Maintenance Cost per User	Annual Maintenance Cost per Application
ESRI	Software	Arc GIS Server Enterprise Std	$20,000	1	$5,000	$5,000
Azteca	Software	City Works Server	$44,910	30	$595	$17,850
Azteca	Software	City Works Work Order API	$14,995	1	$2,995	$2,995
Microsoft	Software	SQL Std (5 cals)	$2,100	5	$0	$0
Amazon	Hardware	EC2 Large Reserved (3 yr. commitment)	$2,400	1	$2,400	$2,400
Totals			$84,405			$28,245
For City Works Server, the first 12 licenses are covered by existing City of Rock Island License. Additional 9 (logins 13-21) are $2,995 each and additional 9 logins 21-30 are $1,995 each.						

Symbiont's current engineering services contract totals $5,431,826. With the addition of this amendment, the revised contract amount will be $5,905,629. All services will be billed on a time and materials basis according to the rate schedule in effect when the work is completed.

The construction phase for this project is currently underway and is scheduled to be completed in March of 2014. O&M system development work would begin immediately upon notification to proceed so as to be ready for testing and commissioning services in the upcoming year.

PROJECT TEAM

Symbiont plans to maintain the same team of highly qualified personnel that designed the Wet Weather Treatment System project for the control system integration services described herein.
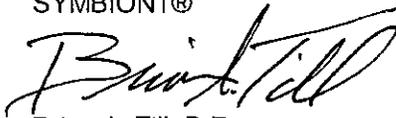
TERMS AND CONDITIONS

Symbiont Standard Terms and Conditions of Agreement as previously executed apply to this contract amendment. Please indicate your acceptance of this contract amendment by having an authorized representative sign the attached and return one copy to Symbiont.

Symbiont appreciates the opportunity to provide the City with the above engineering services. The work scope, cost, and schedule can be further modified as necessary to better meet the needs of the City. Please call at your earliest convenience if you have any questions regarding this proposal.
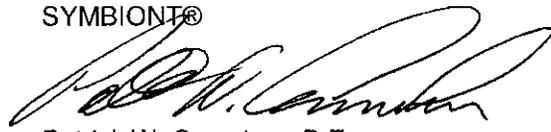
Sincerely,

SYMBIONT®

Brian A. Till, P.E.
Project Manager

SYMBIONT®

Patrick W. Carnahan, P.E.
Municipal Group Manager

Attachments

Symbiont considers the project approach, design, pricing, data, and other business considerations contained in this proposal to be proprietary and confidential business information to be used solely for the purpose of evaluating the proposal. This document and the information contained herein shall not be used for any purpose other than as stated above and shall not be used, duplicated, or disclosed to any other party without Symbiont's prior written consent.

CONTRACT CHANGE ORDER

PROJECT NAME:	Wet Weather Treatment System	**CHANGE ORDER NO.:**	10
OWNER:	City of Rock Island 1309 Mill Street Rock Island, IL 61201	**DESIGNER:**	Symbiont 6737 West Washington Street Suite 3440 West Allis, WI 53214
SUBCONTRACTOR:		**SYMBIONT PROJECT NO.:**	W091615
CONTRACT FOR:	Design Services	**CONTRACTOR PROJECT NO.:**	
CONTRACT DATE:	January 19, 2009		

You are directed to make the following changes in the Contract Documents.

Description: Electronic Operations and Maintenance Manual

Purpose of Change Order: Contract amendment to include development of an electronic operations and maintenance manual for the new wet weather treatment system.

Attachments: 1 **Symbiont Proposal No. 32464**

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIME:**
Original Contract Price $ 1,900,000.00	Original Contract Time (days or date) n/a
Previous Change Order $ 3,144,826.00	Net Change from Previous Change Orders (days) n/a
Contract Price Prior to this Change Order $ 5,431,826.00	Contract Time Prior to this Change Order (days or date) n/a
Net Increase (Decrease) of this Change Order $ 473,800.00	Net Increase (Decrease) of this Change Order (days) n/a
Contract Price with all Approved Change Orders $ **5,905,629.00**	Contract Time with all Approved Change Orders (days or date) n/a

CITY OF ROCK ISLAND	SYMBIONT
By:_____	By _~~signature~~_
Title:_____	Title: _Vice President_
Date: _____	Date: _10/19/12_

Screen No.	Asset Representation Screen	Source of HMI Screen Development	Party Responsible for Populating Information into Database
1	Main WWTP Overview	From Programming Task	Symbiont
2	WWTP Screening	From Programming Task	Symbiont
3	WWTP Pumping	From Programming Task	Symbiont
4	WWTP Grit Handling	From Programming Task	Symbiont
5	WWTP Primary Clarifiers	From Programming Task	Symbiont
6	WWTP Flow Splitter Box	New Screen Development for O&M Manual	City of Rock Island
7	WWTP Aeration Basins and Mixed Liquor Flow Splitter Box	New Screen Development for O&M Manual	City of Rock Island
8	WWTP Final Clarifiers	New Screen Development for O&M Manual	City of Rock Island
9	WWTP RAS/WAS Wet Well/ WAS Storage Tank	New Screen Development for O&M Manual	Symbiont for WAS Storage Tank and City of Rock Island for other items
10	WWTP Thickener Feed Pumps/Polymer/RAS Pumps	New Screen Development for O&M Manual	City of Rock Island
11	WWTP Sludge Drying Beds/Reed Beds	New Screen Development for O&M Manual	Symbiont for Reed Beds and City of Rock Island for other items
12	WWTP Disinfection System	New Screen Development for O&M Manual	City of Rock Island
13	WWTS Screening	From Programming Task	Symbiont
14	WWTS Pumping	From Programming Task	Symbiont
15	WWTS Clarifiers	From Programming Task	Symbiont
16	WWTS Sludge Handling	From Programming Task	Symbiont
17	WWTS Sodium Hypochlorite (SHC)	From Programming Task	Symbiont
18	WWTS Sodium Bisulfite (SBS) and Outfall Conduit	From Programming Task	Symbiont
19	WWTS Ferric Chloride (FC)	From Programming Task	Symbiont
20	WWTS Polymer	From Programming Task	Symbiont
21	Storm Screening & Pumping	From Programming Task	Symbiont
22	Effluent Pumping	New Screen Development for O&M Manual	City of Rock Island
23	Anaerobic Digesters	From Programming Task	Symbiont for upgrades related to WWTP and City of Rock Island for other items
24	Digester Gas Generator and Building Components	From Programming Task	Symbiont
25	Hot Water Boilers	From Programming Task	Symbiont
26	Digester Gas Handling	From Programming Task	Symbiont
27	WWTP Sludge Handling & Storage	From Programming Task	Symbiont
28	Facility Support Systems	From Programming Task	Symbiont for upgrades related to WWTP and City of Rock Island for other items
29	Aeration Blowers	From Programming Task	City of Rock Island
30	WWTP and WWTS Electrical Supply and Distribution	New Screen Development for O&M Manual	Symbiont
31	WWTP and WWTS Electrical Supply and Distribution	New Screen Development for O&M Manual	Symbiont
32	WWTP and WWTS Electrical Supply and Distribution	New Screen Development for O&M Manual	Symbiont
33	Sauke Treatment Facility	New Screen Development for O&M Manual	City of Rock Island
34	Franciscan Treatment Facility	New Screen Development for O&M Manual	City of Rock Island
35	Blackhawk Pump Station	New Screen Development for O&M Manual	City of Rock Island
36	Southwest Wastewater Treatment Plant	New Screen Development for O&M Manual	City of Rock Island
37	30th Street Lift Station	New Screen Development for O&M Manual	City of Rock Island
38	Shady Brook Lift Station	New Screen Development for O&M Manual	City of Rock Island
39	44th Street Lift Station	New Screen Development for O&M Manual	City of Rock Island
40	Casino Area Lift Station	New Screen Development for O&M Manual	City of Rock Island
41	Marine Lift Station	New Screen Development for O&M Manual	City of Rock Island
42	SCADA Network	From Programming Task	Symbiont