BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Application for increase in wastewater rates in Monroe County by K W Resort Utilities Corp.	/ / / / /	Docket No. 20170141-SU FILED: March 14, 2018

DIRECT

TESTIMONY AND EXHIBITS

OF

ANDREW T. WOODCOCK

ON BEHALF OF THE CITIZENS

OF THE STATE OF FLORIDA

TABLE OF CONTENTS

EXHIBITS

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ANDREW T. WOODCOCK P.E., MBA

On Behalf of the Office of Public Counsel

Before the

Florida Public Service Commission

Docket No. 20170141-SU

I. INTRODUCTION / BACKGROUND / SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Andrew T. Woodcock. My business address is 201 East Pine St., Suite 1000, Orlando, FL 32801.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. I am a Professional Engineer (P.E.) licensed in the State of Florida, P.E. license No. 47118. I graduated from the University of Central Florida in 1988 with a B.S. degree in Environmental Engineering, and in 1989 with an M.S. degree in Environmental Engineering. In 2001, I graduated from Rollins College with an MBA degree. In 1990, I was hired at Dyer, Riddle, Mills and Precourt as an engineer. In May 1991, I was hired at Hartman and Associates, Inc., which has since become Tetra Tech. My experience has been in the planning and design of water and wastewater systems with specific emphasis on utility valuation, capital planning, utility financing, utility mergers and acquisitions, and cost of service rate studies. I have also served as utility

rate regulatory staff for St. Johns, Charlotte, and Collier Counties in engineering matters. Exhibit ATW-1, Resume of Andrew T. Woodcock, provides additional details of my work experience.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN UTILITY RATE CASE PROCEEDINGS?

A. Yes. I have filed testimony in a number of proceedings before the Florida Public Service Commission, on behalf of the Office of Public Counsel (OPC). In 2007, I filed testimony in the Aqua Utilities Florida Rate Case (Docket No. 20060368-WS). I also filed testimony regarding the Used and Useful Rule for Water Treatment Systems (Docket No. 20070183-WS), the Aqua Utilities Florida Rate Case (Docket No. 20080121-WS), the Water Management Services, Inc. rate case (Docket 20100104-WU), and the Utilities Inc. of Florida rate case (Docket 20160101-WS). I have also filed testimony on behalf of OPC in two previous KW Resort Rate Cases (Dockets No. 20070293-SU and 20150071-SU).

In addition, I have filed testimony before other agencies and in other jurisdictions. In 2002, I filed testimony on behalf of the St. Johns County Regulatory Authority at a special hearing in an overearnings case against Intercoastal Utilities. I have also filed testimony before the Kentucky Public Service Commission in 2007 on behalf of the Henry County Water District No.2 (Case No. 2006-00191) regarding system development charges. In 2012, I filed testimony on behalf of Charlotte County regarding a rate increase in wastewater rates filed by Utilities, Inc. of Sandalhaven.

Q. ON WHOSE BEHALF ARE YOU FILING TESTIMONY IN THIS PROCEEDING?

A. I am testifying on behalf of the Florida Office of Public Counsel ("OPC" or "Citizens").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. My testimony will cover certain the pro forma adjustments to rate base.

Q. WHAT INFORMATION DID YOU REVIEW WHEN FORMING YOUR OPINIONS AND RECOMMENDATIONS IN YOUR TESTIMONY?

A. I reviewed the Company's Minimum Filing Requirements (MFRs); the Direct Testimony of KWRU Witnesses Christopher A. Johnson and Frank Seidman; the Company's filings in Docket No. 20170141-SU; and its responses to OPC discovery. In addition, I reviewed the relevant Commission rules and statutes applicable to KWRU's request, and some Commission Orders. Finally, with Mr. Johnson, I conducted a site visit of the KWRU wastewater treatment plant to inspect the plant in service and the progress of some of the proposed pro forma projects and to obtain a general understanding of the operation of the systems. Exhibit ATW-2 contains discovery responses from KWRU which I reference in my testimony.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. In my professional opinion, I have found that the electrical, sludge, and chemical costs are reasonable. I reviewed a number of the pro forma projects in the case and

have made a number of adjustments as detailed below. Further, I recommend that KWRU continue to implement asset management principles to their operations and planning activities in order to reduce cost and improve levels of service.

Q. WHAT IS YOUR OPINION OF THE ADJUSTMENTS TO THE TEST YEAR FOR ELECTRICAL, SLUDGE, AND CHEMICAL COSTS?

A. Recognizing that KWRU is experiencing growth in the service area and that the facilities have recently been expanded to accommodate this growth, I find these costs to be reasonable and reflective of future expected customer growth.

Q. WILL YOU GENERALLY DESCRIBE WHICH PRO FORMA ADDITIONS TO RATE BASE YOU ARE ADDRESSING IN YOUR TESTIMONY?

A. The table below summarizes the pro forma additions to rate base proposed by KWRU which I have reviewed and my recommended adjustments:

Project	CAJ Exhibit	KWRU Requested Amount	Recommended Amount
Chlorine Contact Chamber Replacement	CAJ-9 & 10	$1,071,814	$1,071,814
Sludge Drying Beds	None	$15,450	$15,450
WWTP Rehabilitation Project*	CAJ-3, 6-8	$1,104,763.75	$983,483
Lift Station L2A Replacement*	CAJ-11	$146,393	$123,620
WWTP Backup Generator	CAJ-12	$321,005.85	$214,145
Portable Generator Replacement	CAJ-14	$83,470	$0
* These projects should be reduced by 11.7% for failure to secure competitive bids			

Q. WHAT DO YOU LOOK FOR WHEN YOU ARE REVIEWING A UTILITY'S REQUEST FOR A PRO FORMA PLANT ADDITION?

A. Relying on my background as a professional engineer, I look to see (1) whether the requested pro forma project is necessary and prudent, and (2) whether the cost of the addition to rate base is reasonable and prudent. In my opinion, KWRU has demonstrated a need for the pro forma projects I reviewed; therefore, the remaining question to resolve is whether the costs of the pro forma projects are reasonable and prudent.

Q. WHAT DOCUMENTATION IS NECESSARY TO SUPPORT WHETHER THE COST OF ADDITIONS TO RATE BASE ARE PRUDENT?

A. A rate base calculation relies upon plant-in-service amounts that are derived from the actual booked costs of assets in the utility system and are supported by invoices from contractors or equipment suppliers.

Q. WHAT IS THE BEST DOCUMENTATION TO SUPPORT THAT THE COST OF ADDITIONS TO RATE BASE ARE PRUDENT?

A. Actual invoices that document the full scope of the projects and their final installed costs represent the best documentation to support additions to rate base. That same documentary standard would apply to plant additions completed during and after the test year.

Q. WOULD ANY OTHER TYPE OF INFORMATION BE SUFFICIENT?

A. Yes, if it is a pro forma project a utility should provide the Commission competitive bids along with a signed contract. Competitive bids from contractors or suppliers for a well-defined project scope could be considered so long as the selected contractor also has a signed contract or agreement with the utility to perform the work. Competitive bidding, from three or more bidders, is an important aspect of obtaining the best cost available in the marketplace and provides the utility with a range of costs for the project. While it has been the Commission's practice to require at least three bids prior to any approval for pro forma plant additions,[1] relying upon competitive bids alone is not enough because project costs can increase or decrease once the construction contract is executed.

Q. IS IT PRUDENT TO RELY UPON A SOLE SOURCE PROPOSAL?

A. No, it is not prudent in my opinion. Since there is no specific bid rule for water and wastewater companies, the Commission should continue to require utilities to obtain competitive bids for pro forma projects. The use of competitive bids provides evidence that the utility obtained the lowest costs for its projects for the benefit of its customers, and three competitive bids with a signed contract is preferable.

Q. PLEASE EXPLAIN WHY A SIGNED CONTRACT IN ADDITION TO A COMPETITIVE BID IS NECESSARY?

[1] Order No. PSC-11-0010-SC-WU, issued January 3, 2011, in Docket No. 100104-WU, In re: Application for increase in water rates in Franklin County by Water Management Services, Inc.

A. With the selected contractor bound by an agreement or contract to perform the work, there is reasonable assurance that the project will go forward for the agreed upon cost. However, the level of information in a competitive bid or executed contract is not as reliable as actual booked costs.

Q. PLEASE EXPLAIN WHY A COMPETITIVE BID ALONE IS NOT ENOUGH TO JUSTIFY THE PRO FORMA PROJECT COSTS.

A. Competitive bids do not take into account anything that may happen during the construction of the project. For example, there may be an unforeseen site condition that increases the overall project cost. In that case, relying upon bids for an adjustment to rate base could understate the actual project cost. Conversely, the scope of the project may be reduced after the bids are received, thereby reducing the actual cost. If competitive bids alone are accepted as documentation for pro forma additions to rate base, a subsequent true-up proceeding should be conducted to reconcile the actual project costs to rate base. In addition, to provide some assurance that the project will actually proceed beyond the bidding process, documentation should be provided demonstrating the contractor is under contract and work on the project is proceeding.

Q. WHAT IS YOUR OPINION OF THE USE OF ESTIMATES PREPARED BY ENGINEERS OR OTHERS AS SUPPORTING DOCUMENTATION FOR PRO FORMA RATE BASE ADDITIONS?

A. Cost estimates come in various levels of detail and accuracy, depending upon the amount of engineering detail and the amount of analyses requested or conducted. One

of the primary purposes of an engineering cost estimate is to inform the utility of the amount of funds necessary to complete the project. As a result, cost estimates are conservative in nature. No engineer wants to provide a cost estimate to a utility that underestimates the cost of a project, yet that sometimes happens. For example, in the recent KW Resorts Utilities rate case in Docket No. 150071-SU, the initial engineering estimate for the 350,000 gallon treatment tank was significantly less than the competitive bids for the project. If properly performed, an engineering cost estimate is routinely higher than the project cost as determined from competitive bids. Therefore, I do not consider engineering estimates or other estimates as sufficient supporting cost documentation for pro forma rate base additions for cost recovery.

Q. WHY IS IT IMPORTANT, ESPECIALLY IN THE FLORIDA KEYS, TO OBTAIN SEVERAL COMPETITIVE BIDS, INSTEAD OF A SINGLE SOLE SOURCE BID?

A. In order to protect the Company, and ultimately the customers, from possibly paying too much for any construction projects, KWRU's construction projects should have been competitively bid. Obtaining ideally three or more competitive bids is especially important for construction projects in the Florida Keys for the following reasons:

1. Construction in the Florida Keys can be expensive due to the limited size of the region. There is a smaller than usual local market, especially for the specialty construction work. As a result, contractors for larger projects may

have to come from the Florida mainland and could require a cost incentive to do so.

2. There are limited resources in the region including housing for workers and construction materials which creates an inflated local market for materials or requiring that construction materials be imported at additional costs.

3. Access to the Florida Keys is limited to a single roadway connected to the Florida mainland. This increases the logistical requirements (and thereby costs) of transporting large and bulky construction equipment.

Since these limiting factors trend to drive up the overall costs, it would have been prudent for KWRU to have actively sought several competitive bids for all of its major pro forma projects, instead of sole source bidding for some projects.

Q. WHAT TYPE OF COST ESTIMATE INFORMATION DID KWRU PROVIDE IN SUPPORT OF ITS REQUESTED PRO FORMA PROJECTS?

A. For two projects, the WWTP rehabilitation and the lift station L2A replacement, KWRU provided agreements signed with contractors for work that was not competitively bid. For the sludge drying beds, KWRU has provided invoices for the work performed. For the remaining projects KWRU has obtained, or is obtaining, competitive bids. For the WWTP backup generator, KWRU provided competitive bids for equipment but only estimates for the installation and ancillary construction work. For the chlorine contact chamber replacement project, KWRU provided competitive bids and a signed agreement. For the portable generator, KWRU has

provided one bid and is awaiting additional bids. I will opine on the sufficiency of documentation in more detail as I analyze each project.

II. PRO FORMA PROJECTS WITH NO ADJUSTMENTS

Chlorine Contact Chamber Replacement

Q. WHAT DID YOU FIND WITH RESPECT TO THE REPLACEMENT OF THE CHLORINE CONTACT CHAMBER?

A. The total cost of the chlorine contact chamber is $1,071,814 consisting of $935,000 in construction and $107,489 in engineering and construction inspection services. I note that the project was competitively bid and Wharton Smith was selected for the project. I find these costs to be adequately supported for inclusion into rate base.

Sludge Drying Beds

Q. WHAT DID YOU FIND REGARDING THE SLUDGE DRYING BEDS?

A. I find that given the small size of the project that KWRU has provided sufficient justification to support the $15,450 in improvements.

III. PRO FORMA PROJECTS WITH ADJUSTMENTS

WWTP Rehabilitation Project

Q. WHAT DID YOU FIND WITH RESPECT TO THE REHABILITIATION OF THE ORIGINAL TWO WASTEWATER PLANTS?

A. KWRU did not seek competitive bids for the rehabilitation of the two package WWTPs. Instead, KWRU entered into a contract with Evoqua Water Technologies

(Evoqua), without competitive bidding to rehabilitate the WWTPs for a price of $975,000. For the reasons I stated earlier, this action was imprudent.

Q. **WHAT WAS KWRU's EXPLANTION FOR ITS DECISION NOT TO COMPETITIVELY BID THE REHABILITATION PROJECT?**

A. In Exhibit CAJ-8, Mr. Johnson provides a letter from a Mr. Edward Castle, a professional engineer with Weiler Engineering Corporation. Mr. Castle's letter provides a number of explanations that, in his opinion, justifies that "Evoqua should be considered a sole source provider and the only viable option for the rehabilitation of the two existing treatment units." None of Mr. Castle's explanations justify why the Commission should allow KWRU to depart from the Commission's practice of requiring a minimum of three competitive bids.[2] Mr. Castle's five explanations from Exhibit CAJ-8, along with my critiques are as follows:

1. The treatment units rely on the steel members for structural support. Detailed structural drawings are not available. Fabrication of substitute components could result in inadequate structural strength and potential structural failure.

If detailed structural drawings are not available, then it is safe to assume they are also not available to Evoqua giving Evoqua no particular advantage over another contractor. With proper specifications and engineering design, there is no reason to believe that rehabilitated components from any other contractor would result in less than adequate structural strength.

[2] Order No. PSC-11-0010-SC-WU, issued January 3, 2011, in Docket No. 100104-WU, In re: Application for increase in water rates in Franklin County by Water Management Services, Inc.

2. Evoqua provided the existing two treatment units designed specifically for the Stock Island service area and the specific raw wastewater characteristics associated with the system.

While the treatment units were constructed to meet the requirements and wastewater characteristics of the service area, there is nothing particularly unique about either treatment plant. Furthermore, the work comprising the project will not materially change the treatment process of the WWTPs. The work involves rehabilitating or replacing aging components which is something competent contractors like Evoqua; ECO-2000, Inc.; Florida Environmental Construction, Inc. (FEC); or another competent contractor could perform, if KWRU had competitively bid the project.

3. Each treatment unit was designed with specific hydraulic detention times, oxygen transfer efficiencies, biological uptake rates and sludge settling characteristics necessary to achieve AWT treatment. Any modifications to the flow characteristics or oxygen transfer rates may negatively impact the systems' abilities to meet the AWT treatment requirements.

Again, the scope of this project is to rehabilitate old and deteriorating components of the WWTPs. There is nothing in this project that will change or alter the overall advanced wastewater treatment (AWT) process. Based on my review of the proposal from Evoqua, none of the work will result in modifications to the flow characteristics or oxygen transfer rates of the facility. However, if there are such concerns, any Professional Engineer with experience in wastewater design can make the appropriate process design calculations and provide signed and sealed documents that certify to the ability of the WWTPs to continue to meet AWT treatment standards after the rehabilitation work.

4. Evoqua provided a process warranty, guaranteeing the ability of the systems to meet AWT treatment standards. Modifications to the treatment systems by others would void the process warranty.

Any warranty provided by Evoqua can also be provided by another package WWTP provider in the event of a retrofit or rehabilitation. For example, Evoqua's own website states that Evoqua offers retrofit and rehabilitation services regardless of the manufacturer. Similarly FEC, also provides rehabilitation of wastewater treatment plants around Florida. See Exhibit ATW-3, Evoqua Davco & FEC Websites.

5. The treatment units are unique mechanical systems comprised of numerous interconnected components that must function as a whole. Detailed dimensional drawings of the numerous individual components are not available. Fabrication of substitutes would likely result in improper fit without detailed dimensional drawings.

It is not unusual for older WWTP facilities to be missing detailed dimension drawings and, while the treatment units have numerous interconnected components that must function as a whole, we are not talking rocket science here. With proper field investigation, specifications, and construction submittal review, an experienced contractor can provide these services without compromising the structural integrity of the WWTP.

In my opinion, there is nothing in KWRU's five explanations that would preclude any other provider of WWTP rehabilitation services from providing this same service for KWRU. There are numerous package WWTPs in Florida and sooner or later they all require major rehabilitation of this type. In my own career, I have been involved in the rehabilitation, retrofit and repurposing of steel package wastewater treatment

plants. None of the reasons provided by Mr. Castle in his letter are an impediment to competitively bidding the projects. Moreover, none of the explanations in Mr. Castle's letter justify departing from the Commission's requirement to obtain at least three competitive bids for pro forma projects, especially one as large as this one.

Q. SHOULD A WWTP REHABILITATION PROJECT LIKE KWRU'S HAVE BEEN COMPETITIVELY BID?

A. Yes. It is routine for WWTP rehabilitation projects to be competitively bid. In the recent Utilities Inc. of Florida (UIF) rate case in Docket No 160101-WS, UIF obtained competitive bids for its pro forma projects, including the rehabilitation of the Wekiva WWTP.[3] This project was for a WWTP that is somewhat larger than KWRU and involved rehabilitating three package WWTPs to an extent much greater than what we see for KWRU. The scope of the Wekiva project is very similar to KWRU's rehabilitation project. It includes the replacement of corroded steel structural elements, replacing old and corroded equipment, and cleaning and recoating the treatment tanks. UIF received three competitive bids for its project from Evoqua, FEC, and ECO-2000, Inc. A copy of the three bids that were provided by UIF in the rate case are attached as Exhibit ATW-4, Three Bids for Wekiva WWTP Rehab Project.[4] The bids ranged from $1.526 million to $1.704 million representing a spread from lowest to highest of 11.7%. Evoqua was the lowest bidder for the UIF project and was awarded the contract. However, the fact that Evoqua was the lowest bidder

[3] The Wekiva WWTP rehabilitation project was Exhibit PCF-30 to UIF Witness Flynn's direct testimony.

[4] Excerpt of UIF's Exhibit PCF-30 containing the three Wekiva WWTP bids from Evoqua, FEC, & ECO-2000.

for UIF does not automatically mean it would have been the lowest bidder to KWRU's project. Evoqua might very well be the lowest cost solution for KWRU; however, without a competitive bid for comparison, the Commission cannot verify that.

Q. HAS KWRU STARTED THIS PRO FORMA PROJECT?

A. No, it has not. Although KWRU has signed a contract with Evoqua, it is my understanding through conversations with Mr. Johnson during my site visit that the work will not commence until the chlorine contact chamber replacement project is complete.

Q. WHAT IS YOUR RECOMMENDATION FOR THE PRO FORMA ADJUSTMENT FOR THE REHABILITATION OF THE TWO WWTPS?

A. The timing of the planned start of the WWTP rehabilitation shortly after the completion of the chlorine contact chamber replacement project provides for a difficult situation. On the one hand, requiring KWRU to break its contract with Evoqua and competitively bid the project could result in termination costs, a delay in the completion of this rehabilitation project, and Evoqua may still end up being the lowest bidder. In that event, the Commission would have to decide who must bear the termination costs of canceling the initial Evoqua contract. On the other hand, the Commission should not reward KWRU for its imprudent actions by failing to secure at least three competitive bids for this large pro forma project, nor should the Commission depart from its prudent practice of requiring at least three competitive bids. I am of the opinion that there should be a reduction in rate base reflecting the

fact that KWRU prevented the customers from receiving the benefit of the cost efficiencies inherent in a competitive bid process. I note that the recent example of UIF's WWTP rehabilitation project that was bid resulted in a spread from low to high of approximately 11.7% and that can be used as an indicator of the reduction of costs that might have been realized with a competitive bid process. Therefore, I recommend the Commission find that KWRU was imprudent in its failure to secure at least three competitive bids, and reduce the estimated $975,000 project cost by 11.7% or $114,075 for failing to comply with the Commission's practice. The other option available to the Commission, if the utility has not started the project, is to require KWRU terminate the Evoqua contract, undergo a competitive bid process, and hold KWRU liable for any costs arising out of its own imprudent actions of signing a contract without a competitive bid.

Q. WERE THERE ANY OTHER ISSUES YOU IDENTIFIED WITH THE WWTP REHABILITATION PROJECT?

A. Yes, there is an issue related to the engineering fee associated with this project.

Q. WHAT IS YOUR RECOMMENDATION FOR THE ENGINEERING FEES ASSOCIATED WITH THE REHABILITATION OF THE WWTP?

A. Mr. Johnson's testimony includes a total of $129,763.75 as the costs for engineering the WWTP rehabilitation, and he provides a number of documents from Weiler Engineering in CAJ-7, including a number of invoices and an estimate for construction services. These fees cover the Weiler engineering costs associated with

the rehabilitation project including oversight during construction. Overall, I do not take issue with the general level of the costs; however, a number of the invoices provided in the exhibit do not appear to be for the design or construction of the WWTP rehabilitation. In Exhibit ATW-5, Adjustments to WWTP Rehabilitation Project, I summarize this information. It is my opinion that, of the $129,763.75 included in Mr. Johnson's testimony, $122,557.50 is associated with the rehabilitation of the WWTP and should be included in rate base. The remaining $7,205.75 should not be included.

Q. WHAT IS YOUR FINAL RECOMMENDATION REGARDING THE WWTP REHABILITATION PROJECT?

A. The total amount of $1,104,764 should be reduced by $114,075 and $7,205.75 for a total of $983,483.

Lift Station L2A Replacement

Q. WHAT DID YOU FIND WITH RESPECT TO THE LIFT STATION L2A REPLACEMENT PROJECT?

A. KWRU has a signed contract to replace lift station L2A; however, the Company provided no supporting bid information to demonstrate the estimated cost is reasonable. The $146,393 for this project consists of $6,393 for a new control panel and $140,000 for the replacement of the lift station.

Q. WHAT DOES KWRU CLAIM ABOUT LIFT STATION L2A AND WHAT DID YOU FIND?

A. Mr. Johnson states on page 6 of his testimony that lift station L2A was "structurally damaged and was knocked" over during Hurricane Irma. In addition, Recital "B" of the Lift Station Replacement Agreement (Exhibit CAJ-11) states "Hurricane Irma damaged the lift station beyond repair and requires immediate replacement." On Thursday, February 8, 2018, I inspected both the KWRU WWTP site and this lift station with Mr. Johnson. Contrary to his testimony and Recital "B", I found the lift station to be functioning. Mr. Johnson informed me that the lift station control panel was knocked over during the hurricane; however, during my visit I observed that it had been reinstalled. I could find no evidence of any overt structural damage beyond the chronic, poor condition of the lift station wet well.

Q. DOES THE LIFT STATION NEED TO BE REPLACED LIKE KWRU CLAIMS?

A. Mr. Johnson testified this lift station was on the capital improvement replacement schedule and based on my inspection, I agree that this lift station requires replacement. In reviewing the drawings for the replacement of the lift station and the capital replacement schedule provided by KWRU during discovery, it appears that the replacement has been anticipated for some time and its replacement is not due to immediate damage from Hurricane Irma.

Q. WHAT ARE YOUR CONCERNS WITH THE DOCUMENTATION KWRU PROVIDED?

A. Exhibit CAJ-11 provides a signed agreement with B&L Beneway Inc., dated October 23, 2017, for the replacement of the lift station with no supporting bid information. The agreement signed shortly before KWRU filed its MFRs says "the most that KWRU will be responsible for is $140,000", and the "Replacement Work shall be complete by March 31, 2018." However, KWRU is requesting $146,393 for this project.

In addition, Staff's Request for Production of Documents No. 12(a) (Exhibit ATW-2, Attachment 1) asked KWRU to provide all bids associated with the pro forma projects not included with Mr. Johnson's testimony. KWRU provided a bid from Wharton Smith dated May 5, 2014 for the KWRU Forcemain Lift Station Repair, which is a nearby lift station, yet nothing was provided for lift station L2A. KWRU did not provide B&L Beneway's bid for the 2014 Forcemain Lift Station Repair project or for the current lift station L2A replacement project. Therefore, the documentation provided does not support the reasonableness of the project costs.

OPC's Interrogatory No. 90 (Exhibit ATW-2, Attachment 8) asked KWRU why it did not use the bidding process for lift station L2A. KWRU's response was that B&L Beneway was substantially less expensive than the older Wharton Smith bid as a result of B&L Beneway's local labor force and lack of need for housing. KWRU also stated they had requested bids from B&L Beneway and Wharton Smith, and claims

that Wharton Smith declined to submit a bid believing they could not be competitive with B&L Beneway. This explanation is wholly inadequate to justify not obtaining competitive bids from other contractors

It is unclear regarding the timing of when KWRU supposedly requested bids from Wharton Smith and B&L Beneway for lift station L2A. I do know that Wharton Smith is mobilized on the WWTP site for the chlorine contact chamber replacement, has a local labor force to perform that project, and presumably they could provide a bid competitive to B&L Beneway's. Since Wharton Smith is mobilized, they could perform lift station L2A work as part of a change order to the chlorine contact chamber replacement project for less than B&L Beneway. Thus, KWRU's explanation does not sound plausible.

Q. WHAT DID YOU FIND WITH RESPECT TO THE DIFFERENCE BETWEEN THE $140,000 IN THE B&L BENEWAY AGREEMENT AND THE $146,393 THAT IS REQUESTED?

A. Staff's Interrogatory No. 41 (Exhibit ATW-2, Attachment 4) requested KWRU provide an explanation for the difference between what is requested in Schedule A-3 of the MFRs and the supporting Exhibits. For lift station L2A, KWRU responded the contract with B&L Beneway requires KWRU to direct purchase the electrical panel for installation at the lift station.

However, the agreement with B&L Beneway on page 7 of 7 of Exhibit CAJ-11 specifically states that the existing electrical control panel will be reinstalled as part of the project. Furthermore, KWRU has provided no additional supporting information to document the cost of a new control panel.

Q. WHAT IS YOUR RECOMMENDATION REGARDING THE LIFT STATION L2A REPLACEMENT?

A. First, the $6,393 for the new control panel is completely unsupported and does not appear to be a part of the project as described in the agreement with B&L Beneway. Therefore, I recommend this amount be excluded from rate base. Second, similar to my recommendation for the WWTP rehabilitation project, I recommend the Commission find that KWRU was imprudent in its failure to secure at least three competitive bids and reduce the estimated project cost of $140,000 (per the agreement) by 11.7% or $16,380 for failing to comply with the Commission's practice of securing at least three competitive bids. Therefore, a total of $22,773 ($6,393 + $16,380) should be removed from the estimated cost of this project. There is also the option that, if the lift station work has not commenced prior to the hearing, the Commission consider requiring KWRU to break its contract with B&L Beneway, undergo a competitive bid process, and hold KWRU liable for any costs arising out of its own imprudent actions of signing a contract without a competitive bid.

WWTP Backup Generator

Q. WHAT DID YOU FIND WITH RESPECT TO THE WWTP BACKUP GENERATOR?

A. On page 7, Mr. Johnson addresses KWRU's request for the WWTP backup generator. The total amount requested for the pro forma project is $321,055.85, consisting of the estimated costs of the generator ($230,735.85), estimated costs for installation and ancillary equipment ($66,000), and estimated engineering cost ($24,270). The supporting documentation was provided in Mr. Johnson's testimony in Exhibits CAJ-12 and CAJ-13. Exhibit CAJ-12 consists of a quotation from a generator manufacturer totaling $230,735.85. Exhibit CAJ-13 is the engineering estimate for replacement of the generator totaling $24,270. Mr. Johnson's testimony also includes $66,000 in unsupported costs for the installation of the generator and ancillary equipment.

Q. WHAT ARE YOUR CONCERNS WITH THE DOCUMENTATION KWRU PROVIDED?

A. In addition to Exhibits CAJ-12 and CAJ-13, KWRU provided responses to Staff's discovery. In the response to Staff's Request for Production of Documents No. 12(b) (Exhibit ATW-2, Attachment 2), KWRU provided an invoice for the purchase of a generator in the amount of $189,874.89. However, KWRU provided no documentation for the approximately $66,000 in costs for the generator installation and ancillary equipment. According to KWRU's response to Staff's Request for Production of Documents No. 14 (Exhibit ATW-2, Attachment 3), the estimate was

based on verbal discussions with Wharton Smith. Therefore, the $66,000 is unsubstantiated.

In my opinion, the $189,874.89 for the purchase of the generator is adequately supported and should be included in rate base; however, the $66,000 is unsupported and should be excluded.

Q. WHAT IS YOUR OPINION OF THE ENGINEERING ESTIMATE FOR THE REPLACEMENT OF THE GENERATOR IN EXHIBIT CAJ-13?

A. I find the cost estimate of $24,270 from Wieler Engineering, in Exhibit CAJ-13, to be reasonable and it should be included in rate base.

Q. WHAT IS YOUR RECOMMENDATION FOR THE WWTP BACK UP GENERATOR?

A. Of the total $321,005.85 requested, I recommend $214,144.89 ($189,874.89 + $24,270) be included in rate base.

Portable Generator

Q. WHAT DID YOU FIND WITH RESPECT TO THE PORTABLE TOW BEHIND GENERATOR?

A. On page 8 of his testimony, Mr. Johnson testifies that a replacement generator would cost $83,470. Exhibit CAJ-14 provides a quote for a portable generator for $77,089.00. This quote is then increased to account for sales tax and shipping for a

total of $83,470. In its response to Staff's Interrogatory No. 42 (Exhibit ATW-2, Attachment 5), KRWU stated there are three bids for this project with a notation that the process was on-going:

Company	Amount
Pantropic	$83,470.00 (new)
Global Power	$70,262.50 (new)
Global Power	$29,412.00 (used)

KWRU did not provide the two Global Power bids in response to Staff's Request for Production of Documents No. 12(b) requesting updated bids and contract information.

From my review, it appears that KWRU is weighing the options of purchasing a new generator at a cost of over $70,000 or a used generator for approximately $30,000. There are certain advantages to both options. A used generator would have a lower initial cost but that could be offset by a shorter service life and potentially higher operations and maintenance costs. A new generator would cost more but could also last longer and have lower O&M costs. Ultimately, KWRU should make a prudent decision that fits best with its operations to meet the needs of its customers at the lowest possible cost.

In its response to Staff Interrogatory No. 42, KWRU stated that they expect the completion date for this project to be March 31, 2018. Given the difference in costs

between the new or used options, I recommend no amount be included in rate base until KWRU has made the decision on whether to purchase a new or used generator and demonstrates that its decision was prudent and the costs are reasonable.

IV. OVERALL LEVEL OF MAINTENANCE AT THE KWRU FACILITIES

Q. WHAT CAN YOU SAY ABOUT THE OVERALL LEVEL OF MAINTENANCE AT THE KWRU FACILITIES?

A. As part of OPC's Request for Production No. 78 and OPC's Interrogatory No. 139 (Exhibit ATW-2, Attachment 7 and 9), I requested a description of and documentation on KWRU's preventative maintenance plans and plans for repair, refurbishments and replacement activities. My interest was driven by a few issues I noticed with the KWRU WWTP.

My first issue relates to the vacuum tank replacement that occurred in the course of the previous rate case. The vacuum tank, located at the WWTP site, receives the wastewater flow from the vacuum collection system prior to being pumped to the WWTP. A failure in the coatings of the vacuum tank led to extensive corrosion and, as a result, the integrity of the tank and its ability to provide service was compromised. KWRU was forced to immediately seek bids for the replacement of the tank. This is an example of reactive replacement. The tank was at near failure before the Utility sought options for replacement. When a utility is in reactive mode, efficiency drops and costs increase.

The second issue I note is the frequency with which KWRU conducts major rehabilitation on the WWTP tanks. It appears that the WWTP tanks are on a ten year rehabilitation cycle which is on the short end of what is typically seen for steel tank WWTPs. Given that the WWTP is located in a salt water environment that is aggressive to steel structures this is expected. However, a planned program for the systematic inspection of the tankage and interim maintenance activities would lengthen the cycle time between major rehabilitation work and reduce expenditures over time.

Based on what I have seen from the discovery and my visit to the plant site, it is my opinion KWRU is attempting to provide for preventative maintenance in the short term but has no comprehensive plan for tracking maintenance or planning for major renewal and rehabilitation projects in the long term. KWRU should implement asset management principles which is becoming the standard of practice for all wastewater utilities to improve its operations, maintenance and capital improvement actions.

Q. CAN YOU PROVIDE SOME SPECIFICS FOR YOUR OPINION?

A. In response to OPC's Interrogatory No. 139, KWRU stated it has a Maintenance Supervisor that reviews all operation and maintenance manuals for equipment and keeps a log of all maintenance performed. Response to Interrogatory No. 139 also stated that since the recent WWTP expansion an Excel spreadsheet was created to track the maintenance of all components related to the plant. See Exhibit ATW-2, Attachment 9.

In response to OPC's Request for Production No. 78, several versions of a Maintenance Supervisor's list were provided that indicate KWRU is performing regular maintenance and keeping track of the work that is performed; however, it changes from month to month and is not a comprehensive operations and maintenance plan. See Exhibit ATW-2, Attachment 7. Also included with KWRU's response is a six-page table[5] and this table is a good start on creating a maintenance log but it does not include all of the major equipment at the WWTP. Moreover, since there is no actual data on table, I assume it is not being used.

Based upon the documents provided and written responses to OPC's discovery, it appears that KWRU is attempting to undertake preventative maintenance but has no systematized program for tracking and planning the maintenance activities.

Q. WHY IS SUCH A COMPREHENSIVE MAINTENANCE PROGRAM IMPORTANT?

A. Three main reasons. First, it provides a comprehensive centralized list of maintenance activities to be performed which ensures that everything gets scheduled, completed and tracked. Second, in the event of employee turnover, it provides a continuing record of maintenance activities for new employees. Finally, logging the frequency of repair and maintenance activities gives a utility an indication of when a piece of equipment is likely to break, thus providing the utility time to plan for a replacement.

[5] See bates pages "KWRU 017234-017239", Exhibit ATW-2, Attachment 7, page 77-82 of 106.

Q. WHAT IS YOUR OPINION OF KWRU'S CAPITAL FACILITIES PLANNING?

A. I have seen nothing in my review that indicates KWRU is planning for future rehabilitation of the major structures and equipment at the WWTP. The Capital Replacement Schedule provided in response to OPC's Request for Production of Documents No. 33 (Exhibit ATW-2, Attachment 6) does not go beyond the projects that are included in this rate proceeding. In order to prudently manage its operations, KWRU should be looking forward to the next components of the wastewater system that will require expansion or replacement and proactively plan for the work required.

Q. WHY IS PLANNING FOR FUTURE REPLACEMENT AND REHABILITATION IMPORTANT FOR UTILITY SYSTEMS?

A. As we see with the pro forma improvements in this case, particularly the WWTP rehabilitation and the chlorine contact chamber replacement, these projects are expensive. It is incumbent on KWRU to implement proper programmed maintenance and planning to prolong the life of the existing structures and equipment. Failure to do so results in sudden failure like we saw in with the vacuum tank in the last rate case, or fast rehabilitation cycles like we are seeing with the WWTP rehabilitation. All that adds up to additional (and sometimes unnecessary) costs being placed on the backs of the customers.

Q. WHAT IS THE STANDARD FOR ASSET MANAGEMENT IN THE WASTEWATER INDUSTRY?

A. There are numerous practice manuals and guides published by industry trade organizations and associations. The United States Environmental Protection Agency (EPA) has numerous asset management resources on their website including best practices guides, workshops, and free publications that can be downloaded. For example, the EPA provides that Asset Management Resources for Small Drinking Water Systems are available at https://www.epa.gov/dwcapacity/asset-management-resources-small-drinking-water-systems-0. See Exhibit ATW-6, EPA's Asset Management Resources for Small Drinking Water Systems. The asset management principles contained in these free resources are also applicable to wastewater systems.

Q. WON'T IMPLEMENTING THIS ASSET MANAGEMENT TECHNIQUES REQUIRE ADDITIONAL LABOR AND COSTS TO IMPLEMENT?

A. No, they will not. It is a misconception that implementing asset management always requires expensive, sophisticated software, and additional specialized personnel. Core asset management concepts can be implemented by experienced wastewater system managers and operators. Granted there is a work effort to develop the asset management plan and implementing the methodology; however, the savings in the long term far outweigh these costs.

For example, in the recent Utilities Inc. of Florida rate case, Docket No. 20160101-WS, UIF discussed its Operation's Management System and Asset Management Strategy Overview. See Exhibit ATW-7, UIF's Operations Management System. In

this exhibit, UIF's parent, Corix, stated it experienced a year-over-year O&M savings in the range of 5-10% as a result of effective asset management processes.[6]

Q. WHAT IS YOUR RECOMMENDATION IN THIS REGARD FOR KWRU?

A. It is in the customers' and the Utility's best interest that KWRU begin applying asset management principles to their operations and planning activities. Proper implementation should result in reduced cost and improve levels of service.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[6] UIF Operations Management System, Exhibit PCF-50, pages 13-14 of 43, described the O&M savings Corix experienced at the Univrsity of Oklahoma.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Direct Testimony and Exhibits of Andrew T. Woodcock, P.E., MBA has been furnished by electronic mail on this 14th day of March, 2018, to the following:

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Erik L. Sayler
Associate Public Counsel

TETRA TECH

Andrew T. Woodcock, PE
Senior Project Manager

General

Mr. Woodcock has been involved with many different facets of environmental engineering for 28 years. He has special expertise in utility master planning, due diligence investigations, utility valuations, financial feasibility analyses and business plans. Mr. Woodcock's skills include assisting utilities prepare operating and capital programs and supporting those programs with a series of rates and charges to provide for their successful implementation. He is also experienced in conducting economic and feasibility analyses and serves as an expert witness on utility rate regulatory matters.

Education:
MBA, Rollins College, 2001

MS, Environmental Engineering, University of Central Florida, 1989

BS, Environmental Engineering, University of Central Florida, 1988

Registrations/Certifications:
Professional Engineer:
Florida, No. 47118, 1993

Professional Affiliations:
Water Environment Federation

American Water Works Association

Office Location:
Orlando, FL

Total Years of Experience:
(1989) 28

Years with Tetra Tech:
(05/1991) 26

Utility Planning

Mr. Woodcock's water and wastewater utility planning experience includes several master plans, and capital improvements programs that include water, wastewater and reclaimed water utilities. Recent planning projects include the City of Clermont Water, Wastewater and Reclaimed Water Master Plans, the City of Bartow Water Master Plan, and the City of Naples Integrated Water Supply Study. As part of the planning process, Mr. Woodcock has conducted numerous economic, present value and feasibility analyses that evaluate the financial impacts of utility programs and provide useful decision criteria for capital planning.

Mr. Woodcock has participated in over 60 water and wastewater utility valuations and acquisitions for utility systems located throughout the Southeast United States. The acquisition projects cover a wide range of utility system configurations and sizes and include engineering due diligence inspections, valuations, and financing activities associated with the transactions.

Additionally, Mr. Woodcock has experience in the review and analysis of water and wastewater utility rates, charges and impact fees. His experience also extends to providing financial feasibility documentation in support of revenue bonds and utility financial feasibility studies in support of capital funding.

International

Mr. Woodcock has been an integral team member on several infrastructure improvement programs for the US Agency for International Development (USAID). He has conducted field visits to Nigeria and Zambia to evaluate existing infrastructure; meet with prospective teaming partners to identify and recruit local designers; and interview local agency officials and stakeholders to identify project challenges, build consensus, formulate technical approaches, and secure buy-in for development programs.

Prior to his work on international development projects, Mr. Woodcock concentrated on water and wastewater utility planning in the United States. His experience includes master planning and capital improvements programs that include water, wastewater and reclaimed water utilities for major cities. As part of the planning process, Mr. Woodcock has conducted numerous economic, present value and feasibility analyses that evaluate the financial impacts of utility programs and provide useful decision criteria for capital planning. Additionally, Mr. Woodcock has experience in the review and analysis of water and wastewater utility rates, charges, and impact fees. His experience also extends to providing financial feasibility documentation in support of revenue bonds and utility financial feasibility studies in support of capital funding.

TETRA TECH

Andrew T. Woodcock, PE
Senior Project Manager

EXPERIENCE

International

Millennium Challenge Corporation (MCC), Reclaimed Water Tariff Review, Reuse Project, Mongolia. 2017. Tariff Design Lead. Development of a cost of service based tariff structure for the implementation of reclaimed water in Ulaanbaatar, Mongolia. The project included a review of the tariff regulatory institutions of Mongolia which regulate only water and wastewater service. Recommendations for adjustments to the regulatory structure were proposed to implement reclaimed water tariff regulation. The cost of service analysis focused on developing a tariff for reclaimed water based on an number of improvements to Ulaanbaatar's wastewater treatment plants. The reclaimed service was design to supply cooling water to two local power and heating plants in the City. As part of the analysis a comparison of reclaimed service costs to the current cooling water supply costs was developed.

US Agency for International Development (USAID), Sustainable Water and Sanitation for Africa, Zambia. 2012 – 2013. Senior Technical Lead for a Cost of Service Study of the 11 utilities that serve domestic, intuitional and commercial customers to ensure that the utilities can operate as commercially viable utilities, and reliably meet the water and sanitation demand within the service areas. The project supports Zambia's National Water Supply and Sanitation Council (NWASCO) with the overall goal to improve sustainability through promotion of cost recovery throughout Zambia's urban water sector. Conducted initial interviews with NWASCO management and other stakeholders including USAID, MCC, and the eleven commercial utilities. Developed a comprehensive cost of service model to benchmark utility costs against known values and project future costs of service based on numerous escalation factors. The model was presented to NWASCO and representatives of the utilities in two workshops that included not only an overview of the model purpose but also specific training in the use of the model.

US Agency for International Development (USAID), Sustainable Water and Sanitation for Africa, Nigeria. 2012 – 2014. Water Supply Investment Expert for development of an investment plan for urban water supply and sanitation sector of Bauchi State. The plan provides advice for improving budgeting, financial planning, and attracting external funding sources. Prepared a Water Supply Investment Plan, Long Term Business Plan, and Medium Term Business Plan for the local water service provider, Bauchi State Water Board (BSWB). The overall goal of this project is to improve the operating environment of the urban water service provider through promoting good governance, autonomy of the water service provider and promotion of sustainable financing for urban water supply and sanitation services. Conducted a field mission to Nigeria to meet with the BSWB leaders, study existing funding arrangements for capital and recurrent urban water supply expenditure, and assist in assess capital investment needs as well as operations and maintenance needs. The Water Supply Investment Plan and Business Plans will be used to attract investments from international bilateral donors.

US Agency for International Development (USAID) Liberia Municipal Water Project, Liberia. 2014, 2015. Team Leader for strategic and business planning development of five water supply outstations. The development consisted of two sets of workshops designed to educate and develop business plans for five water systems in Liberia. The workshops were attended by numerous utility stakeholders including system operations and management personnel, community leaders and representatives from the Liberia Water and Sanitation Corp. The first workshop introduced the concepts and components of a business plan. The audience was divided into several working groups that were guided through a number of exercises to develop the major components of a business plan. The second round of workshops introduced the business plan template and guided the working groups through the initial development of the business plan that was later finalized by the water systems.

US Agency for International Development (USAID) Sustainable Water and Sanitation for Africa, South Sudan. 2014. Technical Leader for the development of an Investment Plan for sanitation for the City of Juba. The goal of the investment plan is to provide a pathway for the technical, financial and institutional expansion of sanitation in a city of approximately 500,000 people. The plan expands coverage of sanitation in the city initially through the expansion of latrines, supported by a system of exhauster trucks and a treatment lagoon. In later stages the plan envisions the gradual implementation of a piped sewerage system. The plan also provides guidance on the development of an institutional framework, defining the roles of national, state and, local governing bodies. Finally

the plan provides a financial plan with emphasis on the steps required to attract investment from the private and donor sectors.

US Agency for International Development (USAID) Improved Water Sector Management and Governance, Jordan. 2016. Technical Leader developing a strategy to reorganize the Yarmouk Water Company into business units to improve operational efficiency and increase financial transparency within the organization. The plan included identifying the scope of the individual business units, mapping internal pricing activities and allocating resources among the business units. In addition capital projects and best practices were identified necessary for establishing internal controls and tracking costs.

US Agency for International Development (USAID) Improved Water Sector Management and Governance, Jordan. 2017. Technical Leader for a feasibility analysis of merging the Zarqa and Madaba water companies into Miyahuna Water Company. The effort included a review of the organizational structure, technical capability and operations of each organization. Major agreements between the three companies and the Water Authority of Jordan were reviewed and recommendations for updates and revisions were proposed. A number of issues related to the merger were identified that, while not necessarily a barrier to the acquisition require consideration. A conceptual strategy to address each issue was recommended in the project deliverable.

Other – Utility Planning

TA-13 Water Supply and Interim Facilities Planning (20 Year), Miami-Dade Water and Sewer Department, FL. 2017 – Ongoing. Lead Engineer for a system wide master plan of WASD's water treatment plants. Planning efforts involves a detailed analysis of the feasibility of combining the Hialeah and Preston WTPs which are collocated in the northern part of the service area. The analysis includes a condition analysis, performance review and capacity analysis of both facilities to determine the ability of the Preston WTP to assume the treatment capacity utilized by the older Hialeah WTP. As part of the analysis a capital program will be developed for both the decommissioned scenario as well as for continued independent operation. A detailed review of the operations and maintenance costs will be performed to evaluate the economic efficiency of each WTP. The feasibility of the decommissioning was determined through a 20 year life cycle cost analysis.

In the southern service area the capacity of the Alexander Orr WTP was evaluated against new demand projections to determine the timing of constructing a second regional facility. The analysis also considered various water conservation measures at the WTP including high service pump optimization and lime softening efficiency gains in the lime softening treatment process.

Conceptual Evaluation of Water Reclamation and Reuse Alternatives, Tulsa Metropolitan Utility Authority, Tulsa, OK. 2016 – Ongoing. Financial Analyst. TMUA's conceptual evaluation of implementing reclaimed water considers both non-potable and potable uses. The project evaluated the feasibility numerous alternatives for each use. Mr. Woodcock's role on the project evaluated the cost of service of providing non-potable reclaimed water to industry and other uses in the TMUA service area. The cost of service that was developed was compared against TMUA's cost of providing potable water. The feasibility of potable reuse was determined through a present value analysis that considered reuse against projected potable supplies.

Town of Medley Water and Waste Water Rate Assistance, Town of Medley, FL. 2017-ongoing. Senior Engineer. The Town of Medley, a municipality in Miami-Dade County, FL, relies upon water service and wastewater treatment by the Miami-Dade County Water and Sewer Department and is subject to routine rate increases and true-ups with Miami-Dade's cost to serve. In addition, the Town is faced with numerus water and wastewater project that will require funding. Mr. Woodcock is providing professional services to the Town in reviewing its existing water and wastewater rates for cost recovery, and developing a rate structure that better suits the needs of the community. To do this, Mr. Woodcock is performing a rate sufficiency study that serve as a baseline for projecting potential adjustments in the level of revenues that will drive the proposed rates. He is developing rate structure alternatives for the Town, 5-year cash flow projections with the proposed rates, and providing recommendations for the implementation of these adjustments.

TETRA TECH

Andrew T. Woodcock, PE
Senior Project Manager

20-Year Reuse Water Master Plan, Daytona Beach, FL. 2013. Project Manager. The Daytona Beach 20-Year Reuse Water Master Plan evaluated the existing city reuse system and provided a listing of projects to expand the City's use of reclaimed water over the projection period. A hydraulic model of the system was created in Innovzye software using the City's existing CAD drawings and as-builts of recent projects. A unique feature of the modeling effort was to effectively simulate a low pressure reclaimed water transmission line that also acts as an outfall to the Halifax River. When the WWTP produces water that does not meet public reuse standards the pipeline is the sole form of effluent disposal. The model was used to develop an operational protocol for the pipeline given these two conflicting uses. Once the CIP was determined a full reclaimed water rate study was performed to demonstrate how vary levels of investment in the CIP would affect reclaimed rates.

Water, Wastewater, and Reclaimed Water Rate Study, Naples, FL. 2007. Project Manager. Performed a study for the evaluation and adjustment of the City's rate structures for water, wastewater and reclaimed water as necessary to recover costs from capital improvement projects and to promote water conservation. The rate study recommended the development of a tiered structure to promote water conservation and also provided for lower reclaimed water rates to promote the connection to the City's non-mandatory reclaimed water system. The project included multiple public workshops for citizen input and presentations to the City Council, with ultimate adoption of the rate structure.

Water and Wastewater Utility Master Plan, Marion County, FL. 2004. Project Manager. In the previous four years prior to initiation of the Water and Wastewater Master Plan Marion County had quadrupled its utility customer base through a series of utility acquisitions is key growth areas. The primary focus of the Water and Wastewater Master Plan was to provide a roadmap to efficiently consolidate utility systems and establish four County sub regions that would serve as the future basis for utility planning and operations. The Master Plan presented a program for systematically decommissioning small package plants and expanding sub regional facilities to accommodate the existing customer base and projected growth.

Water System Master Planning, Mapping and Modeling, City of Bartow, FL. 2007 Project Manager. Tetra Tech was contracted by the City in 1996 to perform a water master plan. In 2008 Tetra Tech updated the master plan with new projections, an expanded hydraulic model and a revised CIP. The hydraulic model was revised to include completed system improvements and projected extensions to serve growth areas. The resulting CIP was classified by three project types; pressure improvements, fire flow improvements, and growth improvements. The master plan also included an upper level financial analysis that evaluated the impact of CIP funding on the cash flows of the system.

Integrated Water Resources Plan, City of Naples, FL. 2008. Financial Evaluation. Tetra Tech developed an integrated water resources plan for the City of Naples that evaluated all water supply options for a twenty year planning period. All available water supply source were considered including brackish ground water, stormwater, and surface water from the Golden Gate Canal and Naples Bay. Mr. Woodcock performed a financial evaluation of the most technically feasible alternatives to determine the short term impact of capital and operations costs on the utility's cash flows.

Water and Wastewater Master Plan, City of Deltona, FL. 2008. Project Engineer. The water and wastewater master plans for the City of Deltona were the first master plans prepared on the systems since the City's acquisition in 2003. In addition the projections and capacity analysis of facilities a hydraulic model was prepared for both the water and wastewater systems to document system behavior and act as a planning tool to develop the proposed CIP. Hydraulic deficiencies in the water and wastewater systems were already well documented by City staff. The models however, were very useful in determining the magnitude of the deficiencies and the appropriate course of corrective action. The wastewater model was used to determine force main routing to a new WWTP in the developing area of the City. The water model was field calibrated through pressure data record by the City and at remote locations as well as hydrant testing.

Water, Wastewater and Reclaimed Water Master Plan, City of Clermont, FL. 2014. Project Manager for three Master Plans for the City. The master plans were driven by near term permit limitations and accelerated growth in the City's service area. A key component of the joint master planning effort was developing new hydraulic models

for all three systems using WaterGEMS™. Critical to the modeling effort was to simulate system changes as potable water irrigation customers are systematically converted to reclaimed service. As a result of the modeling pressure problems in the potable were alleviated once the conversions were complete allowing the City to reduce its near term CIP without compromising customer levels of service.

Series 2014 Water and Sewer Refunding Revenue Bonds, Pasco County, FL. 2014. Project Manager. Served as the Financial Feasibility Consultant for a $105 million revenue bond issue to fund capital improvement projects. Based on the financial strength of the utility and the projections performed by Tetra Tech the bonds have received a rating of AA from Fitch and AA+ from Standard and Poors.

Series 2008 Water and Sewer Refunding Revenue Bonds, Pasco County, FL. 2008. Project Manager. Served as the Financial Feasibility Consultant for a $182.5 million revenue bond issue to fund capital improvement projects. Based on the financial strength of the utility and the projections contained in Tetra Tech's report the bonds have received an uninsured rating of AA- from Fitch.

Stormwater Rate Study, City of Deltona, FL. 2015. Project Manager. Worked with City staff to determine a viable rate increase in order to cover costs associated with operations and maintenance, and renewals and replacements. Evaluated the impact of CIP financing on rates, established an annual renewal and replacement budget, and evaluated the impact of varying levels of service on projected rates. 2015.

West Virginia Planning and Development Council Regions 4 and 7

Source Water Protection Plans - Alternative Source Water Feasibility Analysis for over 20 water systems, 2015.

Deltona, FL

Consulting Engineers Report, Series 2003; Utility System Revenue Bonds, $81.72 million.

Water and Wastewater Impact Fee Study (2005)

Water and Wastewater Rate Study (2006)

Stormwater Utility Rate Study (2008, 2015)

Water and Wastewater Master Plans (2007)

Marion County, FL

Water and Wastewater Impact Fee Study (2005)

Water and Wastewater Utility Master Plan (2005)

City of Orlando, FL

Research Park Reuse Economic Impact Evaluation (2005)

Capital Facilities Plan and SRF Funding (2016)

Water Coserv I Consolidation Study (2017)

Collier County, FL

Impact Fee Calculation Review (2011)

Meter Accuracy Program and Assessment (2012)

Meter Sizing Policy Review (2012)

Fire Assembly Inventory and Review (2013)

Utility Conveyance Policy Review (2014)

Orange Tree Utilities Due Diligence Investigation (2013)

Utility Conveyance Benchmarking Study (2017)

St. Johns County, FL

Utility Regulatory Services – Intercoastal Utilities (2002, 2005)

Pasco County, FL

Comprehensive Water, Wastewater and Reclaimed Water Rate and Charge Study (2003, 2007, 2011, 2015)

Series 2008 Water and Sewer Revenue Bonds, $182 million

Series 2014 Water and Sewer Revenue Bonds, $104 million

City of Naples, FL

Reclaimed Water Project Assessment and Funding Program (2006)

Comprehensive Water, Wastewater and Reclaimed Water Rate Study (2007)

Stormwater Utility Financial Review (2007)

Integrated Water Supply Study (2008)

City of Minneola, FL

Water Impact Fee Update (2006)

Stormwater Utility Rate Study (2006)

State of Florida - Office of Public Counsel

Utility Regulatory Services – Aqua America Utilities (2007, 2008, 2011)

Utility Regulatory Services – Water Used and Useful Rule (2008)

Utility Regulatory Services – Water Management Services, Inc. (2010)

Utility Regulatory Services – KW Resort Utilities (2008, 2016, 2018)

Utility Regulatory Services – Utilities, Inc. (2017)

City of Punta Gorda, FL

Water Treatment cost Analysis Report (2010, 2014)

City of Huntsville, AL

Alternative Water Supply Study (2008)

City of Daytona Beach, FL

20 Year Reuse System Master Plan (2012)

Demonstration Testing System Feasibility Study (2015)

City of Jacksonville, AR

Acquisition of Little Rock AFB Water System (2015)

City of Clermont, FL

Water, Wastewater and Reclaimed Water Master Plans (2014)

Tulsa Metropolitan Utility Authority

Reclaimed Water Feasibility Analysis (2017)

TETRA TECH

Andrew T. Woodcock, PE
Senior Project Manager

Papers/Presentations

"Water and Wastewater Impact Fees: An Overview" Alabama Water Pollution Control Association, July 28, 2008.

"Developing Multi-Year Business Plans and Infrastructure Master Plans," Institute for Public Private Partnerships (IP3), August 2015.

EXHIBIT ATW-2

OF

ANDREW T. WOODCOCK

ON BEHALF OF THE CITIZENS OF THE STATE OF FLORIDA

COMPOSITE EXHIBIT:
DISCOVERY AND OTHER REFERENCES

Index to Composite Exhibit
Discovery and Other References

Attachment	Reference	Subject
1	Staff POD 12 a	Pro Forma Plant - Lift Station L2A
2	Staff POD 12 b	Pro Forma Plant - Stand By Generator
3	Staff POD 14	Pro Forma Plant - Stand By Generator
4	Staff ROG 41	Pro Forma Plant - Status
5	Staff ROG 42	Pro Forma Plant - Reconcile with Actual
6	OPC POD 33	Capital Improvement Replacement Schedule
7	OPC POD 78	Preventive Maintenance Plan - Documents
8	OPC ROG 90	Pro Forma Plant - No Bids
9	OPC ROG 139	Preventive Maintenance Plan

ATTACHMENT 1

KWRU RESPONSE TO STAFF'S

REQUEST FOR PRODUCTION OF DOCUMENTS NO. 12a

PRO FORMA PLANT – LIFT STATION L2A

~~11. Please provide any documents relied upon in responding to Interrogatory Nos. 2-20 in Staff's Second Set of Interrogatories to KWRU (Nos. 2-42).~~

~~**RESPONSE:** Documents responsive to this Request are provided within folder "11", produced herewith, and labeled to correspond to their attendant Interrogatories. Where responsive documents were referenced within KWRU's interrogatory responses, such documents are provided within their respective folders, produced herewith.~~

12. Please provide the following bid and contract information.

a. Please provide all bids that were solicited for the pro forma projects which were not included as an exhibit to witness Christopher A. Johnson's direct testimony.

RESPONSE: Documents responsive to this Request are provided within folder "12a", produced herewith.

~~b. Please provide the updated bids and contracts, if any, for the pro forma projects included as exhibits to witness Christopher A. Johnson's direct testimony.~~

~~**RESPONSE:** Documents responsive to this Request are provided within folder "12b", produced herewith.~~

KW Resort Utilities Corp
6630 Front Street
Key West, FL 33040
305.295.3301
FAX 305.295.0143
www.kwru.com

Public Wastewater Utility Maintenance Supervisor- Key West

Supervisor in charge of tracking, planning, scheduling, supervising, and documenting all preventative maintenance on a Public Wastewater Treatment Plant, vacuum station, and entire collection system comprised of a vacuum system and a traditional gravity/force main system. Manage a team of direct reports that include mechanics and maintenance technicians. Consult and oversee outside contractors that are brought in to assist with the utility's capital projects and/upgrades or maintenance activities.

Oversee the overall maintenance and repair of wastewater facilities and assets (trucks, heavy equipment, generators, pumps, compressors, blowers, etc.). Provide daily supervision over the maintenance and support wastewater facility assets including preventative, predictive repairs, rehabilitative work or replacement of wastewater assets. Manage the reliability and maintainability of assets, manage utilities and facilities considering loss elimination, risk management, and life cycle asset management.

Must have experience in water/wastewater industry or equivalent knowledge. Wastewater Plant Operator License a bonus. The position requires a valid Driver's License, on-call duties, and the candidate should be capable of lifting 40 lbs. Candidate shall agree to live within a 20 mile radius from the service area to allow candidate to respond to on call duties in a timely fashion.

Position includes company truck, company phone, paid vacation, paid holidays, health benefits including medical/dental/vision, retirement benefits, paid personal time, company paid golf club membership at Key West Golf Course, salary range ($60,000 - $90,000) commensurate with skills and experience.

Key Responsibilities:

- Perform technical, supervisory, and managerial work directing the overall maintenance and repair of the wastewater treatment plant, vacuum station, lift stations, vacuum pits, buffer tanks, etc. Plan, prioritize, assign, supervise, review, and evaluate the work of staff and interface with vendors in the course of maintaining wastewater facilities and infrastructure.
- Ensure activities are closely coordinated with WWTP operations staff, purchasing department, engineering, vendors, and contractors as necessary, to minimize disruption of operations and ensure compliance with all applicable federal and state regulations and permits.
- Manage emergency work and the communication of information throughout the activity.
- Ensure planned maintenance is done efficiently, effectively, and complies with planned maintenance schedule. Assist the Utility VP with development of the schedule to ensure materials, equipment and personnel are available to perform the work. Assist in developing detailed work plans for preventative maintenance, equipment repair, and replacement, and predictive maintenance programs. Make schedule adjustments as necessary and communicate any schedule revisions to the appropriate personnel.

Wharton-Smith, Inc.
CONSTRUCTION GROUP

Following is a detailed Scope of Work & Cost Breakdown. Please do not hesitate to call if you have any questions or comments.

Regards,

Julio Corena
Project Manager
Wharton-Smith, Inc.

CC: Serge Mashtakov, P.E., Weiler Engineering Corporation.
Engineer of Record

Asif Shaikh, Division Manager, WSI
Jeff Wiley, Superintendent, WSI

125 W Indiantown Road, Jupiter, FL 33126 • Phone: 561/748-5956 • Fax: 561/748-5958
CG C032669 PC C048385 CM C035437 CU C056506

Wharton-Smith, Inc.
CONSTRUCTION GROUP

SCOPE OF WORK
KW RESORT UTILITIES FACILITY

PHASE I: FORCEMAIN LIFT STATION REHABILITATION

1) 120"x68" – Demo & replace new station
2) 12' deep
3) Reinstall existing pumps
4) Relocate control panel

***** **PLEASE NOTE** *****

The following list is applicable to Phase I of KWRU Forcemain Lift Station Rehabilitation: Our Proposal is based on the drawings provided to us by Serge Mashtakov, P.E. (Weiler Engineering Corp.) more specifically the following list of drawings dated March 27, 2014.

Drawing List:

Civil

1- Cover Sheet
2- General Notes
3- Site Plan
4- Proposed Lift Station Details

Please review the following list of clarifications:

1. Bonds and Insurance is included.
2. Scope included in this proposal is related to demolition of existing LS structure, disassembly and removal of existing LS equipment (to remain), installation of a new wetwell precast structure, interior and exterior coatings application, any required excavation and backfill associated with installation of new structure, electrical work associated with existing LS shutdown operations for demo and new installations, re-installation of existing pump equipment, mechanical piping, concrete work, and general site restoration.
3. An allowance of $3,500.00 is included for Building Permit Fees for KWRU that may be required for Demolition of existing structure, Installation of new facility structure and Electrical Permits.
4. Submittal review and approval in two weeks after WSI submittal to Engineer of Records and KWRU.
5. Electrical subcontractor selected is Nearshore Electric.
6. Coatings shall be Mainstay (or equal). Take note that this is not Raven Coatings as shown on the plans.
7. Geotechnical Services are excluded.
8. Any Video Surveillance Scope is excluded.

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Wharton-Smith, Inc.
CONSTRUCTION GROUP

9. Any Landscaping and Irrigation Scope is excluded.
10. Fencing scope of work excluded. KWRU advised WSI per site meeting dated 4/24/14 that KWRU operations will remove existing fence and re-install back after completion or LS work.
11. Re-location of existing station control panel is included on this scope. PLC Programming (if any required) not included.
12. Fiber Optic and associated wiring is not required and is excluded.
13. Intercom System Work not applicable and is excluded.
14. Start-up scope of services with pump equipment manufacturer representative is excluded.
15. Powering of new rehabilitated station per existing conditions. New powering scope excluded.
16. Lift Station driveway access restoration to original condition included. New driveway installation excluded.
17. Maintenance of Traffic (M.O.T.) for roadway utility installations included. This is for the existing force main 4"-6" wet-tap requested by KWRU per site visit dated 4/25/14. Minor M.O.T. required for construction safety.
18. Asphalt restoration by others (KWRU).
19. Exemption is taken for lamping and video taping of existing sewer lines.
20. For cost savings, we have not included a dewatering system as requested in Specification Section 02240. Should a dewatering system be needed for a "quick" or "boiling" condition, WSI can submit a proposal at a later date to include it.
21. New structure shall be set wet, without dewatering, flowable fill will be poured around the structure.
22. There is an abandon existing concrete MH structure inside station perimeter area, WSI is taking exemption to removal of such structure. It is not part of scope specified on plans and contract documents.
23. General site restoration to original condition.
24. Per site visit with KWRU dated 4/24/14; WSI was advised no bypass pumping will be required to be provided for lift station rehabilitation work. KWRU advised sewage flows will be directed to a secondary station downstream after plugging influent line at existing MH location in the middle of the street (5Th Street). WSI is taking exemption of bypass pumping services for the proposed work. WSI will not take responsibility of any operation impacts or damage caused to KWRU secondary station due to transfer flows for aforementioned rehabilitation scope.

125 W Indiantown Road, Jupiter, FL 33126 • Phone: 561/748-5956 • Fax: 561/748-5958
CG C032669 PC C048385 CM C035437 CU C056506

Nearshore Electric, Inc.
State Certified Electrical Contractor
#EC13001186

Scope of Work

Owner: KWRU
Project: Force Main Pump Station Rehab
Project Address: 9th & 5th Street
Stock Island, Fl. 33040

Job #140420
Confidential

April 29, 2014

To all concerned,
We are pleased to offer you our proposal for the electrical work required at the Force Main Pump Station in Key West Florida. All work performed by Nearshore Electric, Inc. shall conform to current codes, regulations, and project specifications. All work performed by Nearshore Electric, Inc. shall be warranted for a period of one year. The following breakdown describes the items and services that Nearshore Electric, Inc. shall provide as well as any exclusion from our scope of work.

INCLUDED IN BID:

- Remove control panel and rack and save for re-installation
- Remove conduit and junction boxes
- Install new SCH80 2" conduit form existing customer power pole to new control panel location
- Install new NEMA3R enclosed breaker at existing customer pole
- Install (3) three new SCH 80 2" conduits from control panel to wet well location
- Install (3) three new 2" EYS seal offs at control panel
- Install (3) three new 12 x 12 x 4 PVC junction boxes at new wet well location
- Install (3) three new SCH 80 2" PVC conduits from new junction boxes to wet well
- Install pump cables from wet well to junction boxes
- Install float cables from wet well to new junction box
- Install old control panel and equipment rack at new location
- Install wire and terminate
- Assist in pump station start-up
- Workers Comp/General Liability Insurance
- Taxes
- Warranty

EXCLUDED FROM BID:

- Permit fees
- Pumps
- Float Balls
- Control Panel
- Meter can and riser (use existing)

Bid Summary
Labor..... $5,010.00
Materials..... $5,527.00
Equipment..... $1,548.00

We propose to furnish material and labor, complete in accordance with the above specifications, for the lump sum of:
Twelve Thousand Eight Five Dollars and No Cents..... $12,085.00

Authorized Signature _____ Date 4/29/2014
Jeffery L Kirk ~ President

ATTACHMENT 2

KWRU RESPONSE TO STAFF'S

REQUEST FOR PRODUCTION OF DOCUMENTS NO. 12b

PRO FORMA PLANT – STAND BY GENERATOR

~~11. Please provide any documents relied upon in responding to Interrogatory Nos. 2-20 in Staff's Second Set of Interrogatories to KWRU (Nos. 2-42).~~

~~**RESPONSE:** Documents responsive to this Request are provided within folder "11", produced herewith, and labeled to correspond to their attendant Interrogatories. Where responsive documents were referenced within KWRU's interrogatory responses, such documents are provided within their respective folders, produced herewith.~~

12. Please provide the following bid and contract information.

~~a. Please provide all bids that were solicited for the pro forma projects which were not included as an exhibit to witness Christopher A. Johnson's direct testimony.~~

~~**RESPONSE:** Documents responsive to this Request are provided within folder "12a", produced herewith.~~

b. Please provide the updated bids and contracts, if any, for the pro forma projects included as exhibits to witness Christopher A. Johnson's direct testimony.

RESPONSE: Documents responsive to this Request are provided within folder "12b", produced herewith.

1051557 generator

GLOBAL POWER SUPPLY

136 W. Canon Perdido Street
Suite 200
Santa Barbara, CA 93101
(805) 683-3828

Invoice: 5832-001

Date: 1/19/2018
Sales Order #: 0005832
Customer PO #: GPSQ6863-04

Terms: 50%CIA - 50% prior to
Salesperson: RAH
FOB: Origin
Freight Terms:
Ship Via: BEST WAY
Ordered By: Gregy Wright

Sold To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Ship To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Warranty:

Item	Qty Ship	Description	Unit Price	Extension
*GENERATOR	1	800KW MTU Onsite Energy Generator Set Air Filters: Y Alternator Make: Marathon Alternator Model: 574RSL4038 Alternator S/N: MT-0042707-0117 Amps: 1203 Battery Charging Alternator-Volt: Yes - 24V Block Heater - Watts/Voltage: -20 Deg F Block Heater Included, 208V 1PH 6000W Breaker Mfg: GE Breaker Options: Single Circuit Breaker Breaker Rating: 1200 Amp 3 Pole Condition: New Control Panel: Y Control Panel Mfg: MTU Control Panel Model: MGC-2020 Cooling: Skid Emissions Tier: 2 Enclosed: Sound Level 3 Engine Manufacturer: MTU Engine Model: 12V2000G85-TB Engine S/N: 5352012451 Ext. Notes: Breaker rating 1200 Amp 3 Pole 100% CB Powerbreak SSF16G216 Single Circuit Breaker, CB Auxiliary Switch 1200-4000A 100% Powerbreak, CB Shunt Trip 1200-4000A 24V 100% Powerbreak Frequency: 60 Hz Fuel Tank: 24-Hour 1390 Gallon Extended Base Fuel Tank W Stub-Up, UL142 Fuel Type: Diesel Genset S/N: 95020500364	154,500.00	154,500.00

Continued

GLOBAL POWER SUPPLY
136 W. Canon Perdido Street
Suite 200
Santa Barbara, CA 93101
(805) 683-3828

Invoice: 5832-001

Date: 1/19/2018
Sales Order #: 0005832
Customer PO #: GPSQ6863-04

Terms: 50%CIA - 50% prior to
Salesperson: RAH
FOB: Origin
Freight Terms:
Ship Via: BEST WAY
Ordered By: Gregy Wright

Sold To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Ship To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Warranty:

Item	Qty Ship	Description	Unit Price	Extension
		Governor: Electronic Isochronous Hours: 0 HP: 1194 Insulation Class: H4 kW: 800 kW Rating: Standby Model: 12V2000 DS800 Phase: 3 PMG: Y Power Factor (PF): .8 RPM: 1800 Shipping Info (LxWxH lbs): 350" L X 96" W X 136" H, 28,000 lbs Silencers: Internal Critical Grade Silencer sku: 5358 Sound Level- dB@23feet: 76 Temp Rise: 130 Deg C Trailer: No Voltage: 480 Warranty Term: Year Year: 2017 Estimated Lead Time - In Stock, Ready to Ship Warranty - Mfg. / Vendor Pass Through		
*FREIGHT	1	Freight to Key West, FL	9,138.89	9,138.89
*SERVICE	1	Tank Modifications - Retrofit Sub-BaseTank to meet Florida DEP Code Requirements - Ship Genset to Tramont, Inc where work is to be performed.	4,900.00	4,900.00
*PARTS	1	Placeholder to add Risers to tank - Note: Risers may not be necessary in Key West. If risers are not needed, this placeholder will be credited back to KWRU	1,100.00	1,100.00

Continued

GLOBAL POWER SUPPLY
136 W. Canon Perdido Street
Suite 200
Santa Barbara, CA 93101
(805) 683-3828

Invoice: 5832-001

Date: 1/19/2018
Sales Order #: 0005832
Customer PO #: GPSQ6863-04

Terms: 50%CIA - 50% prior to
Salesperson: RAH
FOB: Origin
Freight Terms:
Ship Via: BEST WAY
Ordered By: Gregy Wright

Sold To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Ship To:
Key West Resort Utilities KWRU
6630 Front Street
Key West, FL 33040

Warranty:

Item	Qty Ship	Description	Unit Price	Extension
*SERVICE	1	Onsite Start and Test NFPA 110 Start-up for (1) 800 kW MTU Generator in Key West, FL per the following: - (1) technicians for up to (1) 8 hour day of start-up and load bank testing - 2 hour load bank test - Includes resistive only load bank and cable (50') rental. - 4 hour O&M Training Notes: - Work to be performed during normal business hours. Anything in addition to what is included above will be billed on a time and materials basis. - Fuel to be supplied by Buyer. - Site is assumed to be within 110 miles of the nearest service center. Anything over 110 miles may result in extra charges. Refer to Signed GPS OTS #GPSQ6863-04 dated 1/17/18 - Payment Terms: 50% due with PO. Balance due Prior to Shipment	6,989.00	6,989.00

Wire Instructions:
Union Bank
400 California Street
San Francisco, CA 94101
ABA: 122000496
Account: 3031053501
Swift Code: BOFCUS33MPK (International Transfers Only)

Payment in US dollars

Subtotal:	176,627.89
Sales Tax:	13,247.09
Total:	$189,874.98
50% Due Now:	$94,937.49

0453

KW RESORTS UTILITIES CORP
CAPITAL ACCOUNT
PO BOX 2125
KEY WEST, FL 33045
PH. 305-295-3301

BB&T
BRANCH BANKING AND TRUST COMPANY
1-800-BANK BBT BBT.com
63-9138/2631

01/24/2018

PAY TO THE ORDER OF

$ **94,937.49

Global Power Supply

DOLLARS

Ninety-four thousand nine hundred thirty-seven and 49/100**********

Global Power Supply
136 W. Canon Perdido Street Suite 200
Santa Barbara, CA 93101

MEMO

AUTHORIZED SIGNATURE

Details on Back. Security Features Included

[redacted]
⑈000453⑈ ⑆263191387⑆ [redacted]

KW RESORTS UTILITIES CORP 0453

01/24/2018 **Global Power Supply**

Date	Type	Reference	Original Amount	Balance Due	Payment
01/19/2018	Bill	5832-001	94,937.49	94,937.49	94,937.49
			Check Amount		94,937.49

1313000 BB&T Capit 94,937.49

KW RESORTS UTILITIES CORP 0453

01/24/2018 **Global Power Supply**

Date	Type	Reference	Original Amount	Balance Due	Payment
01/19/2018	Bill	5832-001	94,937.49	94,937.49	94,937.49
			Check Amount		94,937.49

1313000 BB&T Capit 94,937.49

LMP100 M/P CHECK

ATTACHMENT 3

KWRU RESPONSE TO STAFF'S

REQUEST FOR PRODUCTION OF DOCUMENTS NO. 14

PRO FORMA PLANT – STAND BY GENERATOR

~~13. Please provide all documents supporting, related to, or identified in the response to Interrogatory No. 42 in Staff's Second Set Of Interrogatories to KWRU (Nos. 2-42) including, but not limited to, all updated invoices and bids.~~

~~**RESPONSE:** Documents responsive to this Request are provided within folder "13", produced herewith.~~

14. Please refer to page 7, lines 10-17 of witness Christopher A. Johnson's direct testimony. Witness Johnson stated the generator replacement related costs were estimated to be $66,000. Please provide all bids and/or documentation for the development of this estimate.

RESPONSE: No documents responsive to this Request exist within KWRU's possession, custody, or control. The estimate for related costs is based on verbal discussions with Wharton Smith. A pre-construction meeting was held February 12, 2018, and KWRU expects to receive a firm bid in the coming days.

~~15. Please refer to page 9, lines 9-16 of witness Christopher A. Johnson's direct testimony. Please provide all bids and/or documentation for the estimated cost of the service truck with a crane.~~

ATTACHMENT 4

KWRU RESPONSE TO STAFF'S INTERROGATORY NO. 41

PRO FORMA PLANT – STATUS

~~$6,488.80; (3) Service Contract with AT&T for service and phones - $848.00. A $3,000 contingency was included for any conduit relocation or other infrastructure work which may be necessary to accommodate service to the new office installation after it is constructed.~~

41. Please refer to Schedule A-3 and exhibits CAJ-11 and CAJ-14. Please explain the discrepancies between Schedule A-3 and the exhibit invoices and/or bids for each project listed below:

RESPONSE:

Pro Forma Project	**Schedule A-3**	**Exhibit Invoices/Bids**	**Explanation**
Lift Station	$146,393	$140,000	Contract with B&L Beneway requires owner to direct purchase electrical panel; KWRU to purchase from Hydropumps for $6,393 (sales tax included).
Tow Behind Generator	$83,470	$77,089	The $77,089 bid does not include sales tax or delivery from Miami to Key West.

ATTACHMENT 5

KWRU RESPONSE TO STAFF'S INTERROGATORY NO. 42

PRO FORMA PLANT – RECONCILE WITH ACTUAL

42. Please complete the following tables on the pro forma projects included in witness Christopher A. Johnson's direct testimony. Additionally, please provide the following information for each pro forma project.

a. Reason for bid selection.

b. Need for project.

c. Benefit to customers.

d. Anticipated impacts to operations and maintenance expenses.

RESPONSE:

Pro Forma Project/Need/ Benefit to Customer	**Schedule A-3**	**Number of Bids Received**	**Impact to O&M Expense**	**Three Lowest Bids Company /Amount/ Year**	**Bid Selected**	**Invoices**	**Start Date**	**Estimated Completion Date**
Lift Station Necessary due to poor condition and advanced age of current lift station. Electrical panel blown over/submerged in Hurricane Irma. Benefits customer by ensuring quality of service	$146,393	2	None	B&L Beneway/ $140,000/ 2017 Wharton Smith, Inc./$187, 680/2014	B&L Beneway; Lowest cost option and company has experience on other KWRU lift stations	Weiler #46603 #46658	10/23/17	Start has been delayed due to competing with Monroe County Bernstein Park construction in same area (Bernstein Park construction delayed due to Hurricane Irma)
WWTP Rehabilitation Necessary as	$1,104,764	1	None	Evoqua/$ 975,000.00/2017	Evoqua; Engineer recomm	Weiler #46536 #46606 Evoqua	Date of substantial completi	September 2018

Pro Forma Project/Need/ Benefit to Customer	Schedule A-3	Number of Bids Received	Impact to O&M Expense	Three Lowest Bids Company /Amount/ Year	Bid Selected	Invoices	Start Date	Estimated Completion Date
periodic rehabilitative work is required for steel plants. Benefits customer by ensuring environmental and OSHA compliance					ended sole source provider	#9033257 48	on of chlorine contact chamber project	
Chlorine Contact Chamber Necessary as structural integrity of steel supporting tank has been compromised; Tanks have been in service for more than 20 years	$1,071,814	2	None	Wharton Smith/$9 64,325/20 17 Reynolds Construct ion of Florida LLC/$1.0 94,211/20 17 Evoqua (no bid due to conflict of interest)	Wharto n Smith; Lowest cost option	Weiler #46451 #46535 #46605 #46660	Mobilizi ng 2/19/201 8	5/30/2018
Sludge Drying Beds Necessary as drying beds require periodic renourishment with new media (silica and gravel)	$15,450	Received verbal quotes; Project undertake n by utility personnel	Will decrease need for liquid hauling, decreasin g expense	Used best value suppliers based on verbal quotation (Turn & Burn, B.R.I.A.N ., Inc., Sunbelt,	Lowest cost	Turn & Burn #3302, 3333; B.R.I.A.N. , Inc. #5317-9; Sunbelt #6973685 8-001, 70041972,	5/9/2017	8/4/2017

Pro Forma Project/Need/ Benefit to Customer	Schedule A-3	Number of Bids Received	Impact to O&M Expense	Three Lowest Bids Company /Amount/ Year	Bid Selected	Invoices	Start Date	Estimated Completion Date
				Haskins Plumbing		70041792-001; Haskins #29688		
Generator Necessary as existing (30 year old) standby generator non-operational Benefits customer by ensuring quality of service	$321,006	3	Will reduce expense due to increased fuel efficiency; Decreased frequency of repairs compared to generator replaced	Pantropic/ $230,735.85/2017 Global Power Supply/$189,874.98/2018 Generator Source LLLP/$241,125/2017	Global Power Supply; Lowest Cost	Global Power Supply #5832-001 Weiler #46450 #46533	10/2/2017	Dependent upon chlorine contact chamber project and WWTP rehabilitation project (same site areas/multiple contractors)
Tow behind generator Necessary as existing unit non-operations Benefits customer by ensuring quality of service	$83,470	3; Process ongoing	Minimal, but diesel expected to be more efficient and decrease energy costs	Pantropic/ $83,470/2017 (new generator) Global Power Supply/$70,262.50/2018 (new generator – Doosan) Global Power Supply/$29,412/2018 (used generator –	TBD	N/A	N/A	March 31, 2018

Pro Forma Project/Need/ Benefit to Customer	**Schedule A-3**	**Number of Bids Received**	**Impact to O&M Expense**	**Three Lowest Bids Company /Amount/ Year**	**Bid Selected**	**Invoices**	**Start Date**	**Estimated Completion Date**
				CATXQ60)				
Telephone system Necessary as current COMCAST phone/internet is unreliable; reliable internet necessary for Plant Alarm forwarding to on-call phones	$15,000	1; COMCAST (current) and AT&T only available providers	Increase due to service expense; but will decrease risk of catastrophic communication failure	AT&T Fiber Voice and Data Service	In negotiations for permanent solution	N/A	TBD	TBD
Service Truck with Crane Necessary to obviate need for rental trucks for routine pump lifts, etc. and increase safety for employees performing such duties. Benefits customer by ensuring quality of service	$74,174	5	Will reduce periodic rental expense	Midway Fleet/$77,248/2017 (used truck) Classic Chevrolet /$79,212/ 2017 (used truck) Five Star Ford/$124,528/2017 (new truck) Western Specialty Vehicles/ $37,464/2017 (used truck; crane defective)	KKS Auto, best value based on condition/price ratio	KKS Auto, Order #B16026	12/8/2017	12/8/2017

Pro Forma Project/Need/ Benefit to Customer	Schedule A-3	Number of Bids Received	Impact to O&M Expense	Three Lowest Bids Company /Amount/ Year	Bid Selected	Invoices	Start Date	Estimated Completion Date
				KKS Auto/$40,163.02/2017 (used truck)				
Office structures & Improvements Necessary as Hurricane-damaged office scheduled for demolition Benefits customer by providing safe, liability-free work environment for employees	$288,000	1	Anticipated to reduce office repair/maintenance costs and decrease power consumption due to increased energy efficiency	PP Keys 2016, LLC / $263,000/ 2017	PP Keys 2016, LLC already mobilized on Stock Island modular home project; bulk buyer; low price and prompt delivery decreased office rental and attendant expenses	N/A	10/19/2017	June 30, 2018
New Sand Sifter to replace Cherrington Sand Sifter Necessary as sand sifter non-	$44,300	4	Will reduce maintenance expenses; Warranty on sifter power	Cherrington/$59,125/2018 MECO Mahindra /$43,111.16/2018	MECO Mahindra best value in light of warranty	MECO Mahindra Invoice #2872	2/2/2018	4-6 week lead time

Pro Forma Project/Need/ Benefit to Customer	Schedule A-3	Number of Bids Received	Impact to O&M Expense	Three Lowest Bids Company /Amount/ Year	Bid Selected	Invoices	Start Date	Estimated Completion Date
functional after Hurricane Irma Will benefit customer as drying beds are integral to process and cannot function without sand sifter			train for 7 years decreases repair cost	Kubota/$ 51,477/2018 John Deere/$41,846/2018				

ATTACHMENT 6

KWRU RESPONSE TO CITIZENS'

REQUEST FOR PRODUCTION OF DOCUMENTS NO. 33

CAPITAL IMPROVEMENT REPLACEMENT SCHEDULE

~~objections are raised, those objections are raised in addition and not to the exclusion of these general objections.~~

~~REQUEST FOR CONFERRAL PRIOR TO MOTION PRACTICE~~

~~Undersigned counsel respectfully requests conferral prior to the filing of any motion directed to the following Response to Request for Production. It is possible that KWRU interpreted one or more Requests differently from its intent, or that certain detail requested was inadvertently not provided. KWRU intends to cooperate with the discovery process and to tender all information which it is legally required to tender.~~

~~RESPONSES TO OPC'S THIRD REQUEST FOR PRODUCTION OF DOCUMENTS~~

~~31. General Ledger. Please provide the general ledger for the months of November and December of 2017.~~

~~RESPONSE:~~ ~~Objection. This Request seeks documents which are already in the possession of the propounding party. The General Ledger has been previously produced in this action in response to OPC Request for Production No. 15. See file "KW Resort Utilities Corp. 2016 GL.XLSX".~~

~~32. Quality of Service. Commission Rule 25-30.440(10) requires a list, by customer, of all complaints received during the test year, with an explanation of how each complaint was resolved. Please provide copies of all customer complaints received by the utility during the test year. This should include all complaints regarding service and billing.~~

~~RESPONSE:~~ ~~Objection. This Request seeks documents which are already in the possession and/or equally available to the propounding party. Documents responsive to this Request are provided within Document 09987-2017, filed in this Docket on November 21, 2017.~~

33. Utility Plant in Service. Please provide the "capital improvement replacement schedule" referenced in Mr. Johnson's testimony on Page 6, Line 22.

RESPONSE: The historical schedule is provided within folder "33", produced herewith.

Capital Improvement Replacement Schedule – As of 5/16/2016

2016:
(1) Expansion of plant capacity from approximately .499 MGD to .849 MGD at a cost of approximately $5.2 million – Weiler Engineering was hired to design the plant addition. KWRU put the project out to bid and awarded the bid to Wharton Smith, Inc. Prior to the Wharton Smith contract, KWRU contracted with B&L Beneway, Inc. to relocate existing lines that were going to interfere with the expansion project. B&L Beneway moved existing backwash lines, tapped the existing forcemain and installed approximately 55 feet of 8" pipe. B&L Beneway also rerouted the existing effluent line to the injection wells. Structures International engineering firm was hired to design the foundation of the plant addition. Auger cast piles were determined to be necessary as driven piles collapsed the injection wells in a previous project at KWRU.

(2) AIRVAC vacuum vessel replacement at a cost of approximately $600,000 – Applied Technical Services was hired as a certified tank inspector to perform an inspection of KWRU's vacuum collection tank. It was found that this vessel was in need of immediate replacement. This tank collects all the sewage from the Utility's vacuum collection system and pumps the sewage collected into the plant. Prior to inspection, the vessel needed to be cleaned via a vacuum tanker truck. The Utility hired B.R.I.A.N. Inc., to clean the vessel for the inspectors. Utility personnel assisted the inspectors and cleaners and required the rental of a rescue tripod and a fork lift to lift the hatches of the vessel. Weiler Engineering was hired to engineer the replacement. This requires renting a loaner tank to collect the sewage while the new vessel is being installed.

(3) Lift Station L2A Replacement. Lift Station L2A has experienced significant cement deterioration due to age and salt intrusion due to location. It is the same age as the Force Main Lift Station which was replaced in 2014. Wharton Smith bid the force main lift station previously replaced in 2014 at approximately $187,000. No bids have been received for the Lift Station L2A replacement.

2017:
(1) Replace portions of reuse force main that have not been replaced to date. 80% has been replaced and this project represents the remaining 20%. 2015 public bid by Weiler Engineering for similar installations at Key Largo and Sunshine Key was approximately $260,000.

(2) Replace/repair structural steel on existing wastewater plants (East and West) including structural members underneath catwalk, around influent screen and influent trough, main stairway, and other places throughout plant welding and restorative work.

(3) Replacements/repairs of pumps as necessary due to failure or imminent failure, manhole repairs, forcemain repairs, gravity main repairs, service connection repairs, installation of cleanouts, grouting of anular spaces.

ATTACHMENT 7

KWRU RESPONSE TO CITIZENS'

REQUEST FOR PRODUCTION OF DOCUMENTS NO. 78

PREVENTIVE MAINTENANCE PLAN - DOCUMENTS

~~77. Miscellaneous Expense. Please refer to Page 8 of Christopher A. Johnson's direct testimony, line 20, which states "Comcast is not operating the existing service." Please provide the following documents:~~

~~a. Copies of AT&T bills for July 2017 through January 2018.~~

~~b. Copies of Comcast bills for July 2017 through January 2018.~~

~~c. Copies of all studies, quotes, research, notes, and other documents the company reviewed when looking at alternatives to obtain reliable service to support the SCADA system without paying for two separate but redundant systems.~~

~~**RESPONSE:** As to portion (a) of the Request, responsive documents are provided within folder "77a", produced herewith.~~

~~As to portion (b) of the Request, responsive documents are provided within folder "77b", produced herewith.~~

~~As to portion (c) of the Request, responsive documents are provided within folder "77c", produced herewith.~~

78. Maintenance. Please provide copies of the utility's preventive maintenance plan(s) as well as its plans for scheduled maintenance, repair, refurbishments, and/or replacement activities for utility plant investments

RESPONSE: Documents responsive to this Request are provided within folder "78", produced herewith.

From: Kimmy D. Clements <Kimmy_Clements@pantropic.com>
Sent: Friday, October 20, 2017 3:20 PM
To: Chris Johnson; Roberto A. Garcia
Cc: greg@kwru.com; robert@kwru.com
Subject: RE: COI Example
Attachments: PM inspection reports.pdf

Hi Chris,

I have attached our PM1 inspection report as a guide for maintenance inspections. Please let me know if I can be of further assistance.

Have a great weekend.

Kindly,

Kimmy Clements
Rental Coordinator l Pantropic Power
786-209-0961 l Fax: 305-675-3163
Cell: 786-402-0111
kimmy_clements@pantropic.com
www.pantropic.com

The "Pantropic Power Promise" is to provide an exceptional customer experience.
Please share your ***Feedback*** with us!

From: Chris Johnson [mailto:chris@kwru.com]
Sent: Friday, October 20, 2017 2:20 PM
To: Kimmy D. Clements <Kimmy_Clements@pantropic.com>; Roberto A. Garcia <Roberto_Garcia@pantropic.com>
Cc: greg@kwru.com; chris@kwru.com; robert@kwru.com
Subject: RE: COI Example

Roberto and Kim,

The Utility maintenance group is looking for a check list of maintenance items to be checked on the unit that is presently on site as the Utility's standby generator. Please send a list, SOP, etc. for the maintenance activities and checks that need to be performed on the 800KW CAT unit.

KWRU
KW RESORT UTILITIES

Christopher A. Johnson
President
6630 Front Street
Key West, FL 33040
(305) 295-3301
www.kwru.com

From: Kimmy D. Clements [mailto:Kimmy_Clements@pantropic.com]
Sent: Friday, October 13, 2017 10:04 AM
To: Chris Johnson <chris@kwru.com>
Cc: Roberto A. Garcia <Roberto_Garcia@pantropic.com>; greg@kwru.com; chriskw@bellsouth.net
Subject: RE: COI Example

Got it, thank you ☺

Kimmy Clements
Rental Coordinator l Pantropic Power
786-209-0961 l Fax: 305-675-3163
Cell: 786-402-0111
kimmy_clements@pantropic.com
www.pantropic.com

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From: Chris Johnson [mailto:chris@kwru.com]
Sent: Friday, October 13, 2017 9:54 AM
To: Kimmy D. Clements <Kimmy_Clements@pantropic.com>
Cc: Roberto A. Garcia <Roberto_Garcia@pantropic.com>; greg@kwru.com; chriskw@bellsouth.net
Subject: RE: COI Example

Kim,

Great we will be expecting him/her around 3:00 ish. Attached is an Amended COI they fixed a spelling mistake. -Chris

KWRU
KW RESORT UTILITIES

Christopher A. Johnson
President
6630 Front Street
Key West, FL 33040
(305) 295-3301
www.kwru.com

From: Kimmy D. Clements [mailto:Kimmy_Clements@pantropic.com]
Sent: Friday, October 13, 2017 9:51 AM
To: Chris Johnson <chris@kwru.com>
Cc: Roberto A. Garcia <Roberto_Garcia@pantropic.com>; greg@kwru.com; chriskw@bellsouth.net
Subject: RE: COI Example

Good morning Chris,
Yes I did receive your message when I came out of my meeting. We already have transport heading OUR way to hook up and head south. The driver should be leaving our facility around 11am heading your way. I gave them you cell number as point of contact.

Thank you for your business,

Kimmy Clements
Rental Coordinator l Pantropic Power
786-209-0961 l Fax: 305-675-3163
Cell: 786-402-0111
kimmy_clements@pantropic.com
www.pantropic.com

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From: Chris Johnson [mailto:chris@kwru.com]
Sent: Friday, October 13, 2017 9:48 AM

To: Kimmy D. Clements <Kimmy_Clements@pantropic.com>
Cc: Roberto A. Garcia <Roberto_Garcia@pantropic.com>; greg@kwru.com; chriskw@bellsouth.net
Subject: RE: COI Example

Kim,

I left you a voice message earlier this morning. The Utility is located at 6630 Front Street, Key West, FL 33040. We are actually on Stock Island which is the island next to Key West proper. Mile Marker would be 5 TURN INTO STOCK ISLAND at CVS Pharmacy, the Left onto MacDonald Ave at the Stop Sign then a soft right at WEST MARINE onto 4th Ave, then an immediate LEFT onto Front Street.

KWRU
KW RESORT UTILITIES

Christopher A. Johnson
President
6630 Front Street
Key West, FL 33040
(305) 295-3301
www.kwru.com

From: Chris Johnson [mailto:chris@kwru.com]
Sent: Thursday, October 12, 2017 6:30 PM
To: 'Kimmy D. Clements' <Kimmy_Clements@pantropic.com>
Cc: 'Roberto A. Garcia' <Roberto_Garcia@pantropic.com>
Subject: RE: COI Example

Ms. Clements,

COI is attached. Please let me know if there is a problem by calling me @ 305-522-0052 (cell phone).

Thank you,

KWRU
KW RESORT UTILITIES

Christopher A. Johnson
President
6630 Front Street
Key West, FL 33040
(305) 295-3301
www.kwru.com

From: Kimmy D. Clements [mailto:Kimmy_Clements@pantropic.com]
Sent: Thursday, October 12, 2017 2:21 PM
To: chris@kwru.com
Cc: Roberto A. Garcia <Roberto_Garcia@pantropic.com>
Subject: COI Example

Good afternoon Chris,

I have attached an example of what we require for renting equipment.

Kindly,

Kimmy Clements
Rental Coordinator l Pantropic Power
786-209-0961 l Fax: 305-675-3163
Cell: 786-402-0111
kimmy_clements@pantropic.com
www.pantropic.com

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PANTROPIC POWER

PANTROPIC POWER, Inc.
8205 NW 58th Street
Miami, FL 33166
305-592-4944

PREVENTIVE MAINTENANCE LEVEL 1 INSPECTION EMERGENCY POWER SUPPLY SYSTEMS

CUSTOMER (NAME AND ADDRESS)			MOBILE NO.	
GENERATOR SET LOCATION	CONTACT	EMAIL CONTACT	TELEPHONE NO.	
ENGINE MODEL	SERIAL NO.		SERVICE METER	DATE
GENERATOR MODEL	SERIAL NO.		VOLTS	SERVICE LEVEL

INSPECTION AND PREVENTIVE MAINTENANCE CHECKLIST

	SATIS-FACTORY	UNSATIS-FACTORY	COMMENTS
COOLING SYSTEM			
LEVEL			
COOLANT PROTECTION LEVEL[1]			ADD ❑ YES ❑ NO
ADEQUATE COOLING WATER TO HEAT EXCHANGER			
ROD OUT HEAT EXCHANGER			
ADEQUATE FRESH AIR THROUGH RADIATOR			
CLEAN EXTERIOR OF RADIATOR			
FAN AND ALTERNATOR BELT			
WATER PUMP(S)			
CONDITION OF FLEXIBLE HOSES AND CONNECTIONS[1]			
JACKET WATER HEATER			
INSPECT DUCT WORK, CLEAN LOUVERS			
LOUVER MOTORS AND CONTROLS			
FUEL			
MAIN SUPPLY TANK LEVEL[2]			LEVEL ( )
DAY TANK LEVEL			
DAY TANK FLOAT SWITCH			
SUPPLY OR TRANSFER PUMP OPERATION			
SOLENOID VALVE OPERATION			
FLEXIBLE HOSE AND CONNECTORS			
TANK VENTS AND OVERFLOW PIPING UNOBSTRUCTED			
WATER SEPARATOR/RACOR			
PIPING			
FUEL FILTERS PRIM./SEC.			GAUGE ❑ YES ❑ NO
STRAINER/WATER SEPARATOR			
EXHAUST SYSTEM			
LEAKAGE			
INSULATION AND FIRE HAZARDS			
EXHAUST SYSTEM HANGERS AND SUPPORTS			
FLEXIBLE EXHAUST SECTION			
LUBRICATION SYSTEM			
S.O.S.			TAKEN ❑ YES ❑ NO
OIL LEVEL			ADD ❑ YES ❑ NO
OIL FILTER(S)			
OIL PRESSURE			
CRANKCASE BREATHER			

INSPECTION AND PREVENTIVE MAINTENANCE CHECKLIST

	SATIS-FACTORY	UNSATIS-FACTORY	COMMENTS
BATTERY SYSTEM			
ELECTROLYTE LEVEL[3]			
TERMINALS CLEAN AND TIGHT			
SPECIFIC GRAVITY OR STATE OF CHARGE			
CHARGER AND CHARGE RATE			
EQUALIZE CHARGE			
ELECTRICAL SYSTEM			
GENERAL INSPECTION			
WIRE CHAFING WHERE SUBJECT TO MOVEMENT			
OPERATION OF SAFETIES AND ALARMS			
BOXES, PANELS, AND CABINETS			
CIRCUIT BREAKERS, FUSES NOTE: DO NOT BREAK MANUFACTURER'S SEALS OR PERFORM INTERNAL INSPECTION ON THESE DEVICES			
TRANSFER SWITCH MAIN CONTACTS			
GENERATOR			
BRUSH LENGTH, APPEARANCE, FREE TO MOVE IN HOLDER			
COMMUTATOR AND SLIP RINGS			
BEARING(S)			
BEARING GREASE			
EXCITER			
VOLTAGE REGULATOR			
ROTOR AND STATOR (VISUAL)[4]			
BEARING TEMPERATURE CHECK			
ROTATING RECTIFIER CHECK			
PRIME MOVER			
GENERAL INSPECTION			
SERVICE AIR CLEANER			
GOVERNOR OIL			
GOVERNOR OIL LEVEL AND LINKAGE			
IGNITION SYSTEM - PLUGS, POINTS, COIL, CAP, ROTOR, SECONDARY WIRE INSULATION			
CHOKE SETTING AND CARBURETOR ADJUSTMENT			
MEGOHMMETER TEST[6] (IF APPLICABLE)			
MAIN STATOR			
MAIN ROTOR			
EXCITOR STATOR			
EXCITER ROTOR			
PERMANENT MAGNET[5]			

[1] REPLACE EVERY 3 YEARS
[2] SAMPLE QUALITY OF FUEL ANNUALLY (WATER, ALGAE, CONTAMINANTS)
[3] REPLACE EVERY 2 YEARS
[4] PERFORM MEGGER TEST ANNUALLY
[5] PM - DISCONNECT VOLTAGE REGULATOR FIELD LEADS
[6] UTILIZE THE 30/60 TIME RESISTANCE METHOD

LIGHT LOADING CREATES A CONDITION TERMED *WET STACKING*, INDICATING THE PRESENCE OF UNBURNED FUEL OR CARBON, OR BOTH, IN THE EXHAUST SYSTEM. IT'S PRESENCE IS READILY INDICATED BY THE PRESENCE OF CONTINUAL BLACK SMOKE DURING ENGINE-RUN OPERATION. **A LOAD BANK TEST AT NAMEPLATE RATED CAPACITY SHOULD BE PERFORMED ANNUALLY TO ELIMINATE THIS CONDITION.**

COMMENTS/RECOMMENDATIONS _____

SERVICE PERFORMED BY _____ DATE _____

CUSTOMER REPRESENTATIVE _____ DATE _____

Chris, Greg, Rich
Operations Meeting

~~12 02 2016 @ 12 PM~~

MEETING 1/4/2017 @ 12PM

TOP 5 Items in order of Priority

#1 Vacuum Pits and Buffer Tank Annuals C Line remains to be done

#2 Yoman – impeller is ON need to put base on (2 gaskets), wire it up and bump it to check rotation. Broken Impeller sent to AIRVAC for machining. Follow up closely to insure that the repair and shipping back goes quickly and smoothly. Jon Hartsock

#3 CONEX – make sure that the lists we keep on the computer match the actual inventory. Need to order a Goulds 480VAC, 3Φ pump to back up mud well & backwash, Pines&Palms.

Bayshore Manor Pump- cord/pot/pecker head being sent from Val at Hydro Pump to KWRU.

Barnes Pump on order for Plants (Surge Tank)

#4 Order parts for both division valves (self storage, El Mar, 5th and 5th). Rich NOTE that the division valves are different sizes. All are the same series (Mueller) valve so you do NOT need to dig up more than one. **Rich pricing out complete vs parts purchased separately.**
self storage 5th = 10”
EL Mar F-Line = 8”
5th and 5th = 6” **Need to Verify size on as-builts**

#5 VFD to replace Soft Start Vacuum Panel Greg to get answer from Jon Hartsock then need to place order to have backup on the shelf

US Jetter – set up maintenance visit

Controller Rebuild - Training - 15 Return YES/NO **Greg working with Becky Murphy at AIRVAC**

Manhole Repairs for B.R.I.A.N. the list is on the board in office ADD to this list as other FM system/gravity system problems are discovered. Need to get with BRIAN and then schedule work

~~HOA switches were ordered~~ **Received** ~~Floats 8 were found in inventory~~ **Good**

~~Order Ring and Cutter~~ **we have spares on the shelf for Meyers and Keen**

Bio Blocks **These have been installed where needed and there are some bio blocks in inventory**

~~ADD Check Miriam manholes to Friday checklist~~ **this is being done by the crew to Rich’s standard**

Vac Collection System
Need to fix the 3 vacuum division valves
Airvac EAAV – Hartsock to show us on-site when in Key West in January

Vac Stn
Emglo Compressor in vacuum building needs service
Clean Conical Filters Monthly as steel is corroding
Vacuum Station Maintenance Log is now in the file cabinet under the fan
Add quarterly probe cleaning to maint list
~~Vacuum Pump oil change Done Dec 16~~

Rich is checking shelf life of Chevron oil. Has the supplier will order as needed. Still have approx. 3 gals of Busch oil in case we need to top off any vacuum pump oil levels.
Dispose of spent oil EMC

WWTP

~~Surge Pump (Barnes 3 HP) Order 2 Barnes Pumps Greg to check~~ ~~received 2 new Barnes , one was installed 12/1/2016 in the West Plant, and one is on standby in inventory.~~ **The pump that was on standby in inventory has now been installed on East WWTP surge on December 29th. Another spare Barnes for inventory has been ordered on Wed Jan 4th.**

Collection System

~~Keen slicer on order has not been received it~~ ~~is due to arrive the week of 12-5-2016~~ **Received**
~~Lift station cleaning~~ **done**
Grease Traps Jami Golf Course Main, Laundry mat

I**nspections**

Greg Rich ~~A28 new unit scheduled DEMO Dec 8th~~ A28 now empty lot, awaiting new modular. Oceanside and SIMV ongoing.

Private vacuum system division valves need to be exercised.

Exercise all valves in lift station valve vaults. Make assessment for any maintenance in the valve vaults.

Backyard Survey

helter skelter no organization, not complete, need to reassess Will do the hit list (Greg has) plus C16 and will reassess in Jan/Feb C16 drain in yard (give pics to Jami and send Letter to owner)
Will be conducted in Q1 will involve Greg training the crews on the TV reports. Greg and Rich to review if previous field notes are of any value to the field crew, if yes they will be used. This effort will require the crew to work in an organized fashion, keeping good records, getting records to Rich and Jami. Making sure that no properties are missed. At end of the project there should be a binder created to be used next year. The binder should have field notes, the list of vandalized cleanouts, other properties that require special monitoring for any other reason.

Rich to get the list of properties that knowingly damaged cleanouts (Greg has list). Rich is to have someone verify the properties are okay. Make note, have the guys look for brand new caps as well. If someone knows you are coming (i.e. they see the yard survey tag posted) they may put a new one on last minute. Also have the employee flip the cleanout and install with the special tool.

General Issues and Administrative

Rich Safety Officer–next meeting scheduled for Friday Jan 6th

~~Maintain Maint Log – make daily entries~~ **Being done in the Red Daily Diary**

General Management Goals:

Set standards for the crew, clearly communicate to all employees the expectations, spot check their work (give them feedback positive/negative, instill discipline, stop the wandering, make the employees responsible for having their tools on trucks, everyone should have ALL the regular tools at all times. Keep trucks clean inside and out, these are company trucks not personal trucks. Noon is lunch time but this is not holy, lunch can be shifted to accommodate work. Same with 3:30 no reason to quit working a half hour early.

Reorganize the crew and the crew structure to be team oriented and the crew assignment should be aby the Maint Super not by the crew.

Establish a 10 minute list (here are a few ideas)

Pick up yard litter, Put away tools, supplies, materials, etc, Clean out the back of trucks, Spray down trucks to get salt off (undercarriage), spray down equipment as needed, Kill weeds, chop down bushes, limbs, branches, etc. Clean skim box, take trash down off of plant, clean skimmer box. Wipe down vacuum pumps and equipment to keep it clean

Paperwork – everyone bring binders to meeting every morning, keep sheets updated, receipts in there, notes, ideas, etc. Rule for paperwork fill it out NOW not LATER.

Employee Responsibility paperwork

- Receipts, Call Outs, Job Invoices, Inspection Reports

Making use of morning meetings to inform and educate

Make sure guys have plastic boxes to take notes and to turn things in

- Safety equipment (write down) Truck problems (write down)
- Tool issues (write down Supplies (write down)
- Basic Training (i.e. Chatter box, how to read a camera inspection report, etc.)
- Telephone numbers programmed? Private system list and property access codes

Managing Employees Rich to formulate individual plans going forward
Pierre, Jojo, David,Juan

Completed

Train on panel – Hartsock

Jet Rodding system sched for next week Project Complete

Bio Blocks done as of two weeks ago

Quarterlies – Lift Stations half way to completion DONE

L2A Meyers pump is installed Meyers coming back, L2A, FM, Boyds - Meyers was received

Gear Drive Back up motor and drive

Shop Goulds back under warranty in service West EQ basin

CCC cleaning better pump to move heavier liquid order $922 electric pump Received and should be wired in and operational 12 02 2016

Oceanside valve abandoned, Tortuga West was recently turned when doing Oceanside it is functional, SPCA valve – Greg located it is not buried

– Ask about wiping down pan to get all shavings, grit, etc. out. Matt came back from Airvac and said no we don't need to. Chris and Greg heard from the Top Dog this is not the case. Please come back with this information for us.

Annuals F Line complete began E –Line in process

Purge Cycle when we have problems - You can switch off an on as you see fit, but if things are working should always keep it in Purge mode

Oil Change Bart Always wipe pan every single time

Matt to check on Keen pump that was returned (Eric??) Greg to Call Eric Warranty Rebuild Keen has been received

- **Oil change Busch pumps was comp by 1-4-17 meeting**
- **Lift Station Cleaning (B.R.I.A.N) while doing this assess Bio-Blocks at Lift Stations was comp by 1-4-17 meeting**
- **Organize CONEX –also tag pumps, make sure each and every model of pump has a backup in inventory. was comp by 1-4-17 meeting**
- **Division Valve (Self Storage) on 5th Street. Dig up to get model number and Record in Maintenance Log. was comp by 1-4-17 meeting**
- Golf Cart – being serviced at KWGC **was comp by 1-4-17 meeting**
  Safety Meeting we must do this religiously no excuses. Rich is new Safety Officer to begin ASAP doing every other week. Greg to show where binders are in office. First meeting scheduled for Friday Dec 9 2016.

Exercise division valves - North Stock Island too Force main system and vacuum system. **Done for Q4 was comp by 1-4-17 meeting**

Tighten down all electrical connections, vacuum panel, per Jon Hartsock **was comp by 1-4-17 meeting**

Vacuum Pump oil change Was done December 2016 next oil change is scheduled for 500 hours per AIRVAC recommended maintenance **was comp by 1-4-17**

Lift station cleaning ~~BRIAN needs to set up at KWGC also need to clean MCDC~~ Golf Course Main and L4 are the scheduled first and Pines and Palms will be last We are cleaning all lift stations. **was comp by 1-4-17**

- Exercise HALF of ALL valves within collection systems and treatment facilities
- Check or verify the influent and effluent flow meters for accuracy.
- Check the perimeter fencing and repair any holes in the fence. All wastewater facilities are required to be fenced per FAC 62-600
- Inspections of all tanks within the facility for any structural deficiencies
- Test eye wash and emergency shower
- Inspect fire extinguishers

WEILER ENGINEERING CORPORATION
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TEL 941-505-1700 | FAX 941-505-1702 | WWW.WEILERENGINEERING.ORG

6805 OVERSEAS HIGHWAY | MARATHON | FL 33050
TEL (305) 289-4161 | FAX(305) 289-4162

MEMORANDUM

To: Christopher Johnson

From: Ed Castle, PE

Date: 2 December 2014

Re: Evaluation of Collection Systems Served by KWRU

Introduction

KW Resort Utility engaged the Weiler Engineering Corporation (WEC) to provide a report documenting the quantity, type and condition of the various collection systems connected to the KW Resort Utility Corp. wastewater treatment plant. The reclaimed water transmission system is included in the report

KWRU Owned Systems

Lincoln Gardens Gravity Collection System

The Lincoln Gardens area of South Stock Island consists of a residential area served by a gravity collection system. The gravity mains and manholes are located in the public right of way or in permanent easement granted to the Utility.

The gravity piping is generally vitrified clay. Much of the pipe has been slip-lined with plastic liners, including the gravity laterals. The piping is in good condition. Salinity records show that there is very little saltwater infiltration. Flow records demonstrate that the wet weather inflow and infiltration is limited.

There are three Utility-owned lift stations (discharge into gravity piping) and Utility-owned force main pump stations in the system. The Sunset Trailer Park area discharges into the Lincoln Gardens gravity collection system, using a number of small grinder lift stations.

The gravity collection system consists of approximately:

- 20,525 LF of 8" gravity main
- 300 LF of 10" gravity main
- 53 manholes
- 3,015 LF of 4" gravity service laterals (to property line)

Key West Golf Club Development Gravity Collection System

The Key West Golf Club Development is a residential community located on North Stock Island. It is served by a gravity collection system that discharges to two force main pump stations. The gravity collection system is constructed of PVC and is in new condition. It is located within the common area (streets) of the development.

The gravity collection system consists of approximately:

- 6,282 LF of 8" gravity main
- 662 LF of 6" gravity main
- 36 manholes
- 3,150 LF of 6" gravity lateral (to property line)

South Stock Island Vacuum Collection System

The South Stock Island vacuum collection system serves the remainder of the properties south of US Highway 1 that are not served by the Lincoln Gardens gravity collection system or by the KWRU force main systems. The vacuum system is constructed of PVC piping, fiberglass vacuum pits and concrete buffer tanks. 6" PVC gravity laterals connect properties to the vacuum pits and buffer tanks.

Certain larger properties were provided with a vacuum stub from which privately-owned vacuum collections systems were extended onto the properties. The quantities of privately-owned vacuum collection system piping and pits are not included in the following summary.

The vacuum collection system consist of approximately:

- 13,665 LF of 10" vacuum main
- 4,709 LF of 8" vacuum main
- 5,435 FL of 6" vacuum main
- 844 LF of 4" vacuum main
- 1,660 LF of 3" vacuum service lateral (to vacuum pits)
- 70 vacuum pits
- 13 buffer tanks
- 2,358 LF of 6" gravity lateral (to property line)

The vacuum collection system is operated by vacuum provided from the vacuum pump station located at 6630 Front Street at the KWRU WWTP site. The vacuum collection tank is buried, with adjacent inlet and discharge valve vaults. The submersible sewage pumps are located in the vacuum collection tank, are rail mounted and are readily accessible through two quick-release manways. The vacuum pumps and motor control center are located in an adjacent building. All components are in good condition.

The vacuum pump station consists of:

- One 5,000 gallon vacuum collection tank
- Two 25 HP, 460 V, 3 ϕ, submersible sewage solids-handling pumps
- Four 25 HP, 460 V, 3 ϕ, vacuum pumps

- Motor control center
- Vacuum Station building

Sewage Force Main Systems

The KWRU sewage force main systems consist of force main piping of varying sizes and 10 Utility-owned pump stations. There are approximately 29 privately-owned pump stations connected to the KWRU force main systems. The piping is PVC or HDPE and is in new to good condition and is located in the public right of way and in easements. The quantities of privately-owned force mains are not included in the summary below.

The force main systems consist of approximately:

- 8,110 LF of 8" force main
- 3,636 LF of 6" force main
- 11,085 LF of 4" force main

The sewage pumping stations consist of:

- Pines & Palms Pump Station: Two 5 HP, 480 V, 3 ϕ, submersible solids-handling pumps
- Boyd's Campground Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- Laundromat Lift Station: Two 0.5 HP, 240 V, 1 ϕ, submersible solids-handling pumps
- L2A Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- Forcemain Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- L4 Lift Station: Two 0.5 HP, 230 V, 1 ϕ, submersible solids-handling pumps
- L3 Lift Station: Two 0.5 HP, 230 V, 1 ϕ, submersible solids-handling pumps
- L1 Lift Station: Two 0.5 HP, 230 V, 3 ϕ, submersible solids-handling pumps
- MCDC Main Pump Station: Two 15 HP, 460 V, 3 ϕ, submersible solids-handling pumps
- Golf Course Main Pump Station: Two 5 HP, 408 V, 3 ϕ, submersible grinder pumps

Reclaimed Water Mains

The KWRU reclaimed water transmission system pumps reclaimed water to the Key West Golf Club, the Monroe County Detention Center and has recently been extended to the Lower Florida Keys Medical Center, Gerald Adams elementary school and the Florida Keys Community College. The transmission mains are constructed of PVC and HDPE pipe and are in new to good condition. The piping is located in the public right of way and in easements.

There are two Utility-owned reclaimed water pumping stations. The main pumping station is located at the KWRU WWTP at 6630 Front Street. This pump station is in good condition. The secondary pump station is located adjacent to the reclaimed water storage pond on the Key West Golf Club. The secondary pump station withdraws

reclaimed water from the 8" transmission main upstream of the discharge into the storage pond. It pumps reclaimed water to the Monroe County Detention center and other users on North College Road. The secondary pump station is in new condition.

The reclaimed water transmission system consists of approximately:

- 8,150 LF of 8" transmission main
- 4,525 LF of 4" transmission main
- 16 LF of 3" transmission main

The reclaimed water pumping stations consist of:

- Main Pump Station: Two 40 HP, 460 V, 3 ϕ, dry-well water pumps
- Golf Course Pond Pump Station: Two 2 HP, 230 V, 3 ϕ, submersible water pumps

KW Resort Utilities Corp
6630 Front Street
Key West, FL 33040
305.295.3301
FAX 305.295.0143
www.kwru.com

AIRVAC visit to KWRU

February 21, 2018 @ 10:00AM at KWRU WWTP

Jon Hartsock – Engineering Manager, Jon Mavrick Service Manager, John King Field Services South Florida, Chris Johnson KWRU President, Greg Wright KWRU Vice President

Meeting Notes:

Greg Wright to supply Jon Mavrick with Model of Yeoman purchased from RC Beach. Greg also will give the impeller diameter. Jon will utilize his AIRVAC supplier distributer relationship to leverage the best price quotation possible for the Yeoman pump.

Black magnetic tool is superior to grey magnetic tool.

Composite lids are highly thought of by field personnel. In the future KWRU will definitely consider using them.

For AIRVAC remote support: To allow remote access - Switch DB9 connectors

Also as an operational check there shall be an annual "dial in" from AIRVAC Rochester as an annual KWRU maintenance activity to ensure the communication equipment is working properly.

Jon installed the new AB – PanelView 600 the old (550) is still functioning and is now a spare on the shelf. Jon tested and then trained Chris Johnson how to use the new 600 interface. Chris will train KWRU staff.

To reinstall AB-PanelView 550, wire in DC power (Sola Power Supply 3 wire set up), and plug in dedicated communication cable.

VFD – AB525 probably best and would eliminate the need for the com modules.

Jon Hartsock said that he could help KWRU if we are interested in getting the inches of Hg vacuum level and sewerage tank level integrated into our SCADA system. KWRU will keep this in mind moving forward.

Jon H to provide an AIRVAC control panel complete quotation for future budgeting purposes. Jon advised that the quote will be the generic set up, KWRU will examine for any special needs and convey those back to Jon if necessary.

CJ/CJ

- **South CCC clean to standard**
- **Blower#2 Bearing is now in stock, need to make the repair.**
- **Meyers Sewerage Pump from Vacuum Vessel – Ship to be evaluated and completely refurbished by Kaman. Richard to call Mark Silver at Kaman to work out the scheduling of work.**
- **Richard taking care of mixer going out to be repaired.**
- **Greg to purchase a mixer to backup the mixer in the .350MGD plant**
- **Emglo Compressor Richard to get a new replacement unit**
- **Pines and Palms – valves and valve piping in the valve vault must be replaced.**
- **Blower #3 Erica of Gardner Denver to give options for new, rebuild, etc.**
- **Ship two KWRU Busch pumps out for rebuild and ship the Marathon loaner pump for rebuild and have the shop rebuilding the pump ship back directly to Marathon. Wed March 8th new service company will be on site with a loaner pump to swap out PUMP#3. What kind of oil is recommended by the Busch guy, additional filter, etc.**
- **Organize CONEX – make sure that the lists we keep on the computer match the actual inventory, and tag pumps, make sure each and every model of pump has a backup in inventory.**
- **Mike to do division valve exercise, paint, clean with shop vac, lubricate, and make notes if not working properly. Dig up to get model number and Record in Maintenance Log. All vacuum division valves are the same series of (Mueller) valve so you do NOT need to dig up more than one. self storage=10" 5th&5th = 6" El Mar=**
- **Manhole Repairs for B.R.I.A.N. the list is on the board in office ADD to this list as other FM system/gravity system problems are discovered. Greg to talk to Brian.**
- **Vac Station – Richard has oil on hand (synthetic). More oil is to be ordered after Busch guy consult, then purchase.**
- **US Jetter Jet Rodder as of 3/3 not working well. Richard to get with Brian Barton to look at it when doing the muffin monster. May need to call up service tech to make a repair.**
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C16 drain in yard (give pics to Jami and send Letter to owner) Open

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Exercise division valves - North Stock Island too Force main system and vacuum system. Private vacuum system division valves too.

ADD Check Miriam manholes to Friday checklist

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GREG Send ed pics old blowers vibration on actuator

Because of weather this is moved to FRIDAY 4/14 Grind concrete on south static sat morn. By pass.

RJ/CJ/GW/MB and TS all will train on Monday 4/17 SCADA in general for rich and Chris, ok? Video?

discussion
Greg discussed Trash cans and procedures. For static screenings. Weekend duty. Went over plan with some employees, Rich and Greg to make sure all employees are on board.
Hire 2 maint. positions, underway, switch call out procedure to maint team and operators. Vac still on Rayco.
Location equip in new yard: Conex to replace WS construction trailer, dumpsters by Conex.
Truck situations – On call employees, Lead Operator, etc.
New morning procedures for Tim Sunderland, new round sheets and long term data collection, excel?

GW Lull purchase and Conex.
GW More stone in yard? Yes contact Toppinos
CJ to contact temp fence and contractor to reinstate gate and New fence along xfer stn perimeter
RJ to look into curbs (Toppino,Fergeson, Old Castle) Parking will be figured out as we go.
RJ to have KWRU staff do North plant ballards on Ethernet cord and sludge valve
GW Weiler paint for Sherwin Williams on pvc yard pipe? Need specs from WEC.
GW Test united blowers at 50% and check temp
GW Start # 2 and check actuator

Chemical pump alarms SCADA, connected now? Test before close out? Jeff?

~~GW CCT tell them reoccurring alarms list Done~~

GW and Nearshore B#1 actuator working compared to scada? Faulty alarms? Jeff check? Watch jeff fix?
RJ Sewage pump moisture bypass? Myers ready? Other options?

Steve, blowoff valve on united blower? Maybe #2? Or 3?
Scada vac level? Graph? Vac Pump running? Sewage vac pump running? Jeff? Nice to have but not necessary right now. Revisit later.

CJ will contact AIRVAC Soft start on vac pump no good? Damage veins?
GW and MAB Locate sun crest and cross vac. Also sun crest landings as built or inspec notes... projects such as Bernstein inspec. Also school board bought cotton prop 5th st
GW Order wash down pump, pipe potable to north plant
GW Sand in dry bed #1 and vac build mulch bed, BRIAN. Access for his truck in 1, disconnect? Grout truck to do manhole repairs.

- ~~**South CCC clean to standard**~~
- ~~**Blower#2 Bearing is now in stock, need to make the repair.**~~
- **RJ to stay on top of this Meyers Sewerage Pump from Vacuum Vessel – Ship to be evaluated and completely refurbished by Kaman. Also mixer to be repaired by Kaman.**
- **Greg to purchase a mixer to backup the mixer in the .350MGD plant**
- ~~**Emglo Compressor Richard to get a new replacement unit**~~
- **RJ Pines and Palms – valves and valve piping in the valve vault must be replaced. Parts are in hand work to be scheduled.**
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- **Organize CONEX – make sure that the lists we keep on the computer match the actual inventory, and tag pumps, make sure each and every model of pump has a backup in inventory.**

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Blowers
South – blower2 "chasing" Actuator
All south blowers minimum % or Surge Issue

North
Blowers Thermo - Steve Suggs – Wharton Smith -

Chemical pump alarms SCADA, connected now? Test before close out? Jeff?

ISCO composite samplers
GW and RJ Pressure Test on the influent line – find gauge or buy one
CJ purchase ISCO

RJ VFD's off of the chemical skids and into dry storage (inside trailer)

RJ Meyers Sewage pump bump and check rotation and then put in Conex if possible otherwise weather proof with tarps

RJ Pines and Palms – valves and valve piping in the valve vault must be replaced. Parts are in hand work to be scheduled.

RJ Vacuum Pump Station – Sewerage pump cables exposed, try to find a sheath to protect insulation from the panel to the vessel penetration

RJ clean up the area at the front gate cable reels, pipe, etc.

GW NEW CONEX
GW Lull

CJ Weiler paint for Sherwin Williams on pvc yard pipe? Need specs from WEC. Getting a Bid

GW wash down pump ordered, pipe potable to north plant, get a quote from Nearshore Electric, they need spces from "Chris's boy Michael Nugent"

GW Need to site the washdown pump and the ISCO pad and form and pour

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BRIAN mulch Bed, grout truck

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CJ Ride with rich to private lift station valves on vacuum system

CJ to go with Rich and Jojo to all lift stations

Truck situation Next truck to replace Colorado, keep eye out for good newer used work truck

On Call Discussion

switch call out procedure to maint team and operator team. Vac still on Rayco with this in mind. New Employees being trained

Scada vac level? Graph? Vac Pump running? Sewage vac pump running? Jeff? Nice to have but not necessary right now. Revisit later.

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- Check or verify the influent and effluent flow meters for accuracy.
- Check the perimeter fencing and repair any holes in the fence. All wastewater facilities are required to be fenced per FAC 62-600
- Inspections of all tanks within the facility for any structural deficiencies
- Test eye wash and emergency shower
- Inspect fire extinguishers

GREG Send ed pics old blowers vibration on actuator
Because of weather this is moved to FRIDAY 4/14 Grind concrete on south static sat morn. By pass.
RJ/CJ/GW/MB and TS all will train on Monday 4/17 SCADA in general for rich and Chris, ok? Video?
Greg discussed Trash cans and procedures. For static screenings. Weekend duty. Went over plan with some employees, Rich and Greg to make sure all employees are on board.
Hire 2 maint. positions,

Tucks– ~~On call employees, Lead Operator, etc.~~
~~GW CCT tell them reoccurring alarms list Done~~
~~GW More stone in yard? Yes contact Toppinos~~
~~CJ to contact temp fence and contractor to reinstate gate and New fence along xfer stn perimeter~~
~~RJ to look into curbs (Toppino,Fergeson, Old Castle) Parking will be figured out as we go.~~
~~RJ to have KWRU staff do North plant ballards on Ethernet cord and sludge valve~~
~~New morning procedures for Tim Sunderman new round sheets and long term data collection, excel?~~
GW Test united blowers at 50% and check temp
GW Start # 2 and check actuator
~~GW and MAB Locate sun crest and cross vac. Also sun crest landings as built or inspec notes… projects such as Bernstein inspec. Also school board bought cotton prop 5th st~~
~~Steve, blowoff valve on united blower? Maybe #2? Or 3?~~
~~CJ will contact AIRVAC Soft start on vac pump no good? Damage veins?~~
~~**RJ Coast/Hippie Place on Front St. the vacuum pit fires too often. I suspect a small crack, poor glue joint that is leaking, or other problem that is causing it. The problem is not going to be a massive failure but something more like what I listed. The concrete that protects the cleanout is disturbed needs to be reset level. Before this is done a camera should be used to determine why the pit fires so often and the problem should be corrected.**~~
~~GW Sand in dry bed #1~~
~~**Organize CONEX – make sure that the lists we keep on the computer match the actual inventory, and tag pumps, make sure each and every model of pump has a backup in inventory.**~~
~~**RJ Vac Station – Richard has oil on hand (synthetic) from KENNY. More oil is to be ordered after Busch guy consult, then purchase. Need to have enough oil to do all 4 pumps. Need to have exhaust filters on hand for all 4 pumps.**~~
~~**US Jetter Jet Rodder as of 3/3 not working well. Richard to get with Brian Barton to look at it when doing the muffin monster. May need to call up service tech to make a repair.**~~
~~**RJ to stay on top of this Meyers Sewerage Pump from Vacuum Vessel – Ship to be evaluated and completely refurbished by Kaman. Also mixer to be repaired by Kaman.**~~
~~GW and Nearshore B#1 actuator working compared to scada? Faulty alarms? Jeff check? Watch jeff fix?~~

Chris, Greg, Rich

Operations Meeting ~~11-10-2016 @12:00 PM~~

~~————————————~~12 02 2016 @ 12 PM

Vac Collection System

Self Storage Division Valve 10" Mueller

Order the internal mechanism, get model number off of actual valve (field dig) check daily notes may have to redig

Yoman – impeller off to put on new impeller

Oceanside valve, Tortuga West, SPCA valve, Airvac EAAV

Vac Stn

Clean Conical Filters Monthly

Tighten down all electrical connections, vacuum panel, per Jon Hartsock

Annuals – vac oil and exhaust check when the oil was done Jamie

Train on panel – Hartsock

Manual operation

Annuals

Purge Cycle when we have problems??

Oil Change Bart – Ask about wiping down pan to get all shavings, grit, etc. out. Matt came back from Airvac and said no we don't need to. Chris and Greg heard from the Top Dog this is not the case. Please come back with this information for us.

WWTP

~~Gear Drive Back up motor and drive~~

~~Surge Pump (Barnes 3 HP) Order 2 Barnes Pumps Greg to check~~

Shop Goulds back under warranty in service West EQ basin

CCC cleaning better pump to move heavier liquid order $922 electric pump

Collection System

Matt to check on Keen pump that was returned (Eric??) Greg to Call Eric D.
Keen slicer on order has not been received
Quarterlies – Lift Stations half way to completion
L2A Meyers pump is installed Keen on Monday – Meyers coming back, L2A, FM, Boyds
C16 drain in yard (give pics to Jami and send Letter to owner) Open
Grease Traps Jami Golf Course Main, Laundry mat

~~Bio Blocks~~ ~~done as of two weeks ago~~
Inspections David Greg Rich
Backyard surveys – helter skelter no organization, not complete, need to reassess
Jet Rodding system sched for next week
Lift station cleaning BRIAN needs to set up at KWGC also need to clean MCDC
Exercise division valves - North Stock Island too! Force main system and vacuum system.
General Issues and Administrative

Safety Meeting we must do this religiously no excuses. Rich is new Safety Officer to begin ASAP doing every other week. Greg to show where binders are in office.

Employee Responsibility paperwork

- Receipts
- Call Out
- Job Invoices
- Inspection Reports

Making use of morning meetings to inform and educate

Make sure guys have plastic boxes to take notes and to turn things in

- Safety equipment (write down)
- Trucks (write down)
- Tools (write down)
- Supplies (write down)
- Basic Training (i.e. Chatter box, how to read a camera inspection report, etc.)
- Telephone numbers programmed??
- Private system list

Managing Employees Rich to formulate individual plans going forward

- Pierre
- Jojo
- David
- Juan

Vac Grease – Done ????
Oil change out for chevron
Dispose of spent oil, and such EMC
US Jetter – set up maint visit

- Exercise HALF of ALL valves within collection systems and treatment facilities
- Check or verify the influent and effluent flow meters for accuracy.
- Check the perimeter fencing and repair any holes in the fence. All wastewater facilities are required to be fenced per FAC 62-600
- Inspections of all tanks within the facility for any structural deficiencies
- Test eye wash and emergency shower
- Inspect fire extinguishers
-

Chris, Greg, Rich

Operations Meeting ~~11-10-2016 @12:00 PM~~

~~12 02 2016 @ 12 PM~~

TOP 5 Items in order of Priority

#1 Oil change Busch pumps

#2 Vacuum Pits and Buffer Tank Annuals

#3 Lift Station Cleaning (B.R.I.A.N) while doing this assess Bio-Blocks at Lift Stations

#4 Organize CONEX – make sure that the lists we keep on the computer match the actual inventory, also tag pumps, make sure each and every model of pump has a backup in inventory.

#5 Division Valve (Self Storage) on 5th Street. Dig up to get model number and Record in Maintenance Log. Then Order parts for both division valves (self storage and 5th and 5th). Rich NOTE that the division valves are different sizes.

self storage = 10”

5th and 5th = 6”

Both are the same series (Mueller) valve so you do NOT need to dig up more than one.

Rich to get the list of properties that knowingly damaged cleanouts (Greg has list). Rich is to have someone verify the properties are okay. Make note, have the guys look for brand new caps as well. If someone knows you are coming (i.e. they see the yard survey tag posted) they may put a new one on last minute. Also have the employee flip the cleanout and install with the special tool.

Golf Cart – being serviced at KWGC

Emglo Compressor in vacuum building need service?

Controller Rebuild - Training - 15 Return YES/NO

Manhole Repairs for B.R.I.A.N. the list is on the board in office ADD to this list as other FM system/gravity system problems are discovered.

HOA switches were ordered ~~Floats 8 were found in inventory~~

Order Ring and Cutter should have one on the shelf for Keen and one on the shelf for Meyers

Bio Blocks - Reassess with BRIAN when conducting lift station cleaning.

ADD Check Miriam manholes to Friday checklist

Vac Collection System

Self Storage Division Valve 10” Mueller also 5th and 5th valve is frozen

Order the internal mechanism, get model number off of actual valve (field dig) check daily notes may have to re-dig verified we don’t have the model number so a re-dig is planned.

Yoman – impeller off to put on new impeller

~~Oceanside valve abandoned, Tortuga West was recently turned when doing Oceanside it is functional, SPCA valve – Greg located it is not buried~~

Airvac EAAV – Hartsock to show us on-site when in Key West in January

Vac Stn

Clean Conical Filters Monthly as steel is corroding

Tighten down all electrical connections, vacuum panel, per Jon Hartsock

Annuals – vac oil and exhaust check when the oil was done Jamie Was done in August 2016 next oil change is scheduled for December once the oil comes in. Rich is checking shelf life of Chevron oil

~~Train on panel – Hartsock~~

Add quarterly probe cleaning to maint list

Manual operation

Annuals F Line complete began E –Line in process

Purge Cycle when we have problems - You can switch off an on as you see fit, but if things are working should always keep it in Purge mode

Oil Change Bart – ~~Ask about wiping down pan to get all shavings, grit, etc. out. Matt came back from Airvac and said no we don't need to. Chris and Greg heard from the Top Dog this is not the case. Please come back with this information for us~~. Always wipe pan every single time

WWTP

~~Gear Drive Back up motor and drive~~

~~Surge Pump (Barnes 3 HP) Order 2 Barnes Pumps Greg to check~~ –received 2 new Barnes ,-one was installed 12/1/2016 in the West Plant, and one is on standby in inventory.

~~Shop Goulds back under warranty~~ ~~in service West EQ basin~~

~~CCC cleaning better pump to move heavier liquid~~ ~~order $922 electric pump~~ Received and should be wired in and operational 12 02 2016

Collection System

~~Matt to check on Keen pump that was returned (Eric??)~~ ~~Greg to Call Eric D.~~ ~~Warranty Rebuild Keen has been received~~ Keen slicer on order has not been received it is due to arrive the week of 12-5-2016

~~Quarterlies – Lift Stations~~ ~~half way to completion~~ DONE

~~L2A Meyers pump is installed~~ ~~Meyers coming back, L2A, FM, Boyds~~ - Meyers was received

C16 drain in yard (give pics to Jami and send Letter to owner) Open

Grease Traps Jami Golf Course Main, Laundry mat

~~Bio Blocks~~ ~~done as of two weeks ago~~

Inspections David Greg Rich A28 new unit scheduled DEMO Dec 8th. Oceanside and SIMV ongoing.

Backyard surveys – helter skelter no organization, not complete, need to reassess Will do the hit list (Greg has) plus C16 and will reassess in Jan/Feb

~~Jet Rodding system~~ ~~sched for next week~~ Project Complete

Lift station cleaning ~~BRIAN needs to set up at KWGC~~ ~~also need to clean MCDC~~ Golf Course Main and L4 are the scheduled first and Pines and Palms will be last We are cleaning all lift stations

Exercise division valves - North Stock Island too Force main system and vacuum system. Private vacuum system division valves too.

General Issues and Administrative

~~Safety Meeting we must do this religiously no excuses.~~ ~~Rich is new Safety Officer to begin ASAP doing~~ every other week. ~~Greg to show where binders are in office.~~ First meeting scheduled for Friday Dec 9 2016.

Maintain Maint Log - make daily entries

General Management Goals:

Set standards for the crew, clearly communicate to all employees the expectations, spot check their work (give them feedback positive/negative, instill discipline, stop the wandering, make the employees responsible for having their tools on trucks, everyone should have ALL the regular tools at all times. Keep trucks clean inside and out, these are company trucks not personal trucks. Noon is lunch time but this is not holy, lunch can be shifted to accommodate work. Same with 3:30 no reason to quit working a half hour early.

Reorganize the crew and the crew structure to be team oriented and the crew assignment should be aby the Maint Super not by the crew.

Establish a 10 minute list (here are a few ideas)

- Pick up yard litter
- Put away tools, supplies, materials, etc.
- Clean out the back of trucks
- Spray down trucks, equipment as needed
- Kill weeds
- Chop down bushes, limbs, branches, etc.
- Clean skim box, take trash down off of plant, clean skimmer box.
- Wipe down vacuum pumps and equipment to keep it clean

Paperwork – everyone bring binders to meeting every morning, keep sheets updated, receipts in there, notes, ideas, etc. Rule for paperwork fill it out NOW not LATER.

Employee Responsibility paperwork

- Receipts
- Call Out
- Job Invoices
- Inspection Reports

Making use of morning meetings to inform and educate

Make sure guys have plastic boxes to take notes and to turn things in

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- Trucks (write down)
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Oil change out for chevron

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US Jetter – set up maint visit

- Exercise HALF of ALL valves within collection systems and treatment facilities
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- Check the perimeter fencing and repair any holes in the fence. All wastewater facilities are required to be fenced per FAC 62-600
- Inspections of all tanks within the facility for any structural deficiencies
- Test eye wash and emergency shower
- Inspect fire extinguishers
-

Q1 2015 Bonus Objectives

1) Pump SN#, model, etc. for all Lift Stations and Spare Pumps. Implement system to track pumps as they are removed and installed. Should include retirements and new pump acquisitions. System should be in place and all employees should be trained with regard to the tracking system. This includes training ALL field personnel and the applicable Administrative personnel.

   The system should be in place and the training completed by April 7TH. By Dec 31, 2015 the database should have a complete accounting of every pump owned by KWRU and includes all pumps in the wet wells and all spare pumps.

2) Assisting with the morning meeting. In the beginning attend the meeting frequently to insure that the meeting is being used effectively and is being taken seriously. This would be a good time to throw in some suggestions or ask some leading questions to get feedback that everyone can see is useful. Do everything you can to involve all employees (PA). Once the meeting is up and running and seems effective, back off and make once a week drop-ins on the meeting. Safety is to be scheduled weekly and records shall be kept for review at end of quarter for bonus review. Safety shall continue weekly until year end, again year-end, bonus contingent on record review at end of the year showing weekly meetings, topic of meeting, signatures by attendees, etc. We have safety binders that have a tail gate talk on almost every topic you can use these and it is perfectly fine to repeat them as our staff has enough turn over that it will be new to most of the staff.

3) Make sure the programs are set up in the binders. Monitor that they are being done as per the schedule (weekly, quarterly, and annually). Review the Binders and provide guidance and training for employees should any such training deficiency be deemed necessary. Provide an assessment for management with regard to any PM that is not being done as intended or as frequently as it should be.

   a) Binder for Lift Station PM
   b) Binder for Line Cleaning
   c) Binder for Back Yard Survey
   d) Binder for WWTP Preventative Maintenance
   e) Binder for exercise division valves Quarterly
   f) Binder for vacuum pit and buffer tank annuals
   g) Inspection program

Q2 2015 Bonus Objectives

1) Roy's unit count. Make a site visit and quantify if units have been converted into simplex, duplex, triplex, quadplex, 5-plex, or 6 unit multifamily.
2) City KW Transfer Facility—finish contract docs, ERC calculations, etc. Work with General Contractor to establish a flow based off of the lift station calculations as submitted in the DEP permit application. Resolve the ERC sheet and send to the customer for review.
3) Safe Harbour Marina—WEC study, review the water meter readings, review the water meters that service the Hogfish bar and Grill restaurant, the live aboard slips, the non-live aboard slips, the houseboats, the commercial businesses, the Hidden Supper Club Private Bar/Restaurant for private parties/special events, and all other uses of the property.
4) P.M. Lift Station—work with John Welsh on proper procedures and documentation. Do the first few as an example so he can have a demonstration and a document of properly conducted PM's. You can then watch him do the next several and provide guidance, direction, and further training. I would try to use different lift stations.
5) Blower #2. – Evaluate the problem with the blower. Check all warranties and come up with the best solution to solve the problem.
6) Yoman – Engage with distributor/manufacturer's representative to see what options there are for the Yoman sewerage pump.
7) Blower alarm set up: Research everything involved with regard to setting up an alarm on the Gardner Denver (Lampson) Blowers. Engage Jeff Kirk

Q3 2015 Bonus Objectives

1) Point of contact for .849 MGD expansion for all bidders and their subs.
2) Procure bids for the expansion by late November.
3) Coordinate all correspondence and field visits with KWRU management and the Utility Engineer.
4) COTS – Research capacity and water use.
5) Lincoln Gardens leaking laterals – Prepare letters for those property owners who have broken laterals. Check TV reports and if field verification is necessary please administer the work orders and provide the necessary follow through.

Q4 2015 Bonus Objectives

1) Finalize Pump inventory list (includes pumps in all lift stations and pumps in inventory)
2) Populate a list of retired equipment
3) Surge Pump Goulds (480 VAC 3Φ) - please research Goulds vs Barnes as the specifications by the O&M Manual is different when comparing the original plant install to the upgrade install.
4) Quarterly Lift Station Maintenance (look at my notes from my last inspection) and at my general notes focus duct seal, IR, and some copper looks oxidized so this needs to be stripped and re-landed. The duct seal and the oxidation are related. The bottom of the panels are not to have debris of any kind please remove any such debris. Also the panels should be wiped down if necessary (I noted a few).
5) There are 2 electrically skilled associates on staff. In the past, this has always been done by one person. Split up the lift stations and assign half to each, but have the records by employee for accountability. Explain that they are to work independently after the training is completed. You should go check at least one, randomly, from each electrician. I would pick one that had a few

notes affiliated with it. In not done correctly find out why the work was not done properly and take corrective action to insure the substandard work is not repeated in the future.

6) Yoman pump (continue to work toward a solution) 25 hp
7) Drying Bed sand replacement (find the proper grade of silica and arrange transportation). Plan the project.
8) Safety Meetings for December (you are to conduct a safety meeting and make sure the others get done)

Q1 2016 Bonus Objectives

1) Draft an outline of new on call policy along with financial impact using historical projections and current staff and salary levels. For financial impact, utilize K.B. and Jami as necessary.
2) Draft operator training use materials online or elsewhere—do not reinvent the wheel. There is quite a bit of training material in use already but you will find that it needs consolidation and updating.

Q2 2016 Bonus Objectives

1) Vacuum vessel of the AIRVAC system.
    a) Work on the tank evaluation, engage Weiler Engineering to assist in preparing options to repair or replace the tank.
    b) Research the various materials used by AIRVAC in the tanks and find out what they recommend in the buried tank applications.
    c) Discuss a plan to put a bid package out complete with specifications, coatings, etc.
    d) Put a schedule together, as the plan comes into focus the dates can get tighter.
2) Supervise the administrative staff with the PSC required Notice for the Rate Case. Make sure that the notices are prepared ahead of the deadline.

Q3 2016 Bonus Objectives

1) Create a development plan for Glenn Miller. Goals should be DEP Permit, DMR preparation, laboratory procedures, documentation, etc.
    a) Work with Glenn, by ordering supplies with Glenn. Show him the vendors, the catalogues and websites to find supplies, distributors, etc. Similarly if equipment requires repair or calibration.
    b) The plan should include short term goals, with goal dates, and then the tracking should happen. By tracking management can intervene if there is lack of focus on the tasks that are important.
    c) Longer term goals should be set with dates as well. These should be reviewed less often with the employee but you as manager should be looking at this on a regular basis. Customer Service.

2) Assist management with monitoring that customers are being helped by the second ring in a courteous and professional manner.

Q4 2016 Bonus Objectives

1) Assume the lead on the Vacuum Tank Replacement Project
2) Perform the Contract Administration for new connections CVS and Rusty Anchor. Perform the site visits and act as liaison to the engineers and contractors.
3) Review all calibration (flow meter, etc.) and make sure all calibrations that are due are scheduled with outside contractors or are completed in house. This is to be your assignment until all calibrations are completed. Please make a list of calibration dates, intervals, and other notes.

Q1 2017 Bonus Objectives

1) Prepare an outline of the SCADA training document that will become a Q2/Q3 Objective in final format.
2) Hire mechanic to fill opening left by Travis
3) Make an employment offer to a Lead Operator
4) Send notes from your last meeting with Rich, and continue to send brief updates to me after each meeting in a timely fashion.
5) Get 3 quotations for a Lull machine.
6) Schedule the rebuild of 4 KWRU owned Busch pumps and resolve shipping problem.
7) Prepare all retirements ready for fiscal year ended Dec 31, 2016. Include a spreadsheet and the backup for original purchase price or replacement cost for each item on the retirement list. If the Utility didn't replace an item for example got rid of a vacuum truck and didn't replace it, you must price out the same vacuum truck (or as close as possible) and have a hardcopy backup of the price quote. You should probably consult Kaitlin and please delegate to Jami as necessary.

Q2 2017 Bonus Objectives for Greg Wright

1) Lull—expand the search for more vendors. Try to find a used one, in very good condition, at an attractive price. The goal is to present 3 options to the Board of Directors.
2) Confined space training. Research who provides training and inventory the current equipment (i.e. gas detector, calibration gas, tripod, winch, harnesses, etc.). Replace any equipment that is no longer safe.
3) List all spare parts as it relates to new blowers, mixers, SCADA, PLC, breakers, interface, probes, electrical parts, etc.
4) Purchase all mission critical spare parts.
5) Evaluate with Rich spare pumps for every lift station. Inform me of any pump not backed up at present.
6) Hire maintenance tech with Richard involved in every aspect of the hiring process.
7) Meet with Jami once a week and copy me the assignments you give her. Begin this week of 5/8/17 then 5/15/17, 5/22/17 and forward.
8) Review with Jami the pump list.

Capital Project Schedule
2/22/2018

2016
The vacuum tank replacement is scheduled to be placed in service before December 25, 2016. Cost assumption: $550,000 (based on actual costs incurred to date, contract cost, and future expense estimates)

Replacement and Repair of pumps as necessary due to failure or imminent failure, manhole repairs, forcemain repairs, gravity main repairs, service connection repairs, installation of cleanouts, grouting of anular spaces. Cost assumption: Variable

2017
The .350MGD plant expansion is scheduled to be placed in service in March 2017. Cost assumption: $5,200,000 (based on actual costs incurred to date, contract cost, and future expense estimates).

Lift Station L2A replacement originally planned for late 2016 (see Utility Response to OPC First Interrogatory #5) is now scheduled for 2017. Cost assumption: $187,000.00 (based on similar lift station bid from Wharton Smith in 2014.)

Replace portions of reuse force main. Cost assumption: $260,000.00 (pricing based on public bid from Weiler Engineering 2015 for installations in Key Largo and Sunshine Key.)
Maintenance on .250MGD plant and .249MGD plant. Cost assumption: $187,880 (based on engineers estimate ($93,940) X 2)

Replacement and Repair of pumps as necessary due to failure or imminent failure, manhole repairs, forcemain repairs, gravity main repairs, service connection repairs, installation of cleanouts, grouting of anular spaces. Cost assumption: Variable.

380.4 Sludge Drying Beds: Perform new media installation on drying beds (4). This is a periodic capital project as after several years the media becomes compacted and no longer allows the filtrate to pass thru.

CCC and Filter replacement Project: Replace two trains

Pro forma plant additions: 2018-2019
354.3 L2A Lift Station
380.4 WWTP Rehabilitation
380.4 Chlorine Contact Chamber
380.4 Generator
371.3 Tow behind generator
390.7 Telephone System
391.7 Service Truck with Crane
354.7 Office Structures & Improvements
395.7 New sandsifter

PERIODIC MAINTENANCE SCHEDULE

* Preventive Maintenance to be performed by an Authorized Mechanic

** Preventive Maintenance to be performed by authorized Operator.

**1. Test standby generator system
**2. Inspect battery and cables
**3. Check engine oil level
**4. Check gearbox oil levels (if so equipped)
**5. Check coolant level
**6. Check generator ground connections
**7. Test/inspect optional starting aids

Every 120 Hours or Every Three months (which ever occurs first)
**1. Inspect and test fuel system connections
**2. Inspect exhaust system
**3. Inspect/test fuel supply system

Once very six months
*1. Change engine oil and filter
*2. Lubricate engine controls
*3. Service engine air cleaner
*4. Service engine fuel filter
*5. Test engine safety controls
*6. Inspect fan belts
*7. Check engine coolant level
*8. Inspect engine cooling system hose
*9. Check battery

Once annually
*l. Test fuel injection nozzles
*2. Inspect all wiring
*3. Test engine starter operation
*4. Retorque fan bolts
*5. Replace all rubber hoses (as necessary)
*6. Replace engine fan belts (as necessary)
*7. Evaluate the standby generator system
*8. Drain, flush, refill cooling system (as necessary)

KWRU WWTP PM Schedule

Equipment: Sludge gear, motor, drive chain (EAST)
Sludge gear, motor, drive chain (WEST)
Grease motor and gearbox QUARTERLY
Grease chain TWICE a YEAR
Change gear box oil ONCE a YEAR (80-90wt oil)

Main Blowers (LAMSON)
Blower #1, #2, #3
Grease blowers and motors QUARTERLY (high speed high temperature grease)
Check filter elements MONTHLY change AS NEEDED

Surge blowers (2) (EAST)
Grease blowers and motors QUARTERLY
Check filter elements MONTHLY change AS NEEDED
Change oil YEARLY (SAE30wt Non detergent)

Surge blower/thickener (WEST)
Grease blower and motor QUARTERLY
Check filter elements MONTHLY change AS NEEDED
Change oil YEARLY (SAE 30wt Non detergent)

Effluent pumps and motors
Grease motors and pumps QUARTERLY

Valves
5@ effluent box (1 in ground to wells)
3@ wells (in ground)
2@ WWTP influent (in ground)
4@ filter inlets 2 knife north filters & 2 ball south filter
1@ south CCC bypass (in ground)
2@ north CCC bypasses (knife valves)
4@ mud well
Exercise all valves QUARTERLY

KW Resort Utilities Corp
6630 Front Street
Key West, FL 33040
305.295.3301
FAX 305.295.0143
www.kwru.com

Maintenance Supervisor

Supervisor in charge of tracking, scheduling, and documenting all preventative maintenance on Wastewater Treatment Plant, Vacuum Station, and entire collection system.

To plan, manage, document, supervise, and oversee the overall maintenance and repair of wastewater facilities and assets (trucks, jet rodder, generators, trash pumps, compressors, etc.). Provide daily supervision over the maintenance and support wastewater facility assets including preventative, breakdown, predictive repairs and/or replacement of wastewater assets. Manage the reliability and maintainability of assets, processes, utilities and facilities considering loss elimination, risk management, and life cycle asset management

Key Responsibilities:

- Perform technical, supervisory, and managerial work directing the overall maintenance and repair of the wastewater treatment plant, vacuum station, lift stations, vacuum pits, buffer tanks and all related valves, controls, and appurtenances. Plan, prioritize, assign, supervise, review, and evaluate the work of staff and interface with vendors in the course of maintaining wastewater facilities.
-
- Ensure activities are closely coordinated with WWTP operations staff, purchasing department, engineering, vendors, and contractors as necessary, to minimize disruption of operations and ensure compliance with all applicable federal and state regulations and permits.
- Manage emergency work and the communication of information throughout the activity.
- Ensure planned maintenance is done efficiently, effectively, and complies with planned maintenance schedule. Assist the Utility Vice President with development of the schedule to ensure materials, equipment and personnel are available to perform the work. Assist VP in developing the detailed work plans for preventative maintenance, equipment repair, and replacement, and predictive maintenance programs. Make schedule adjustments as necessary and communicate any schedule revisions.
- Oversee the preventive maintenance, equipment repair and replacement, and predictive maintenance work; track and schedule work assignments, ensure equipment downtime is minimized, direct maintenance and repairs as needed to ensure operational integrity and regulatory compliance are maintained.
- Mentor and Lead, motivate, develop, and evaluate all personnel assigned to you.

CJ/CJ

- Be a leader in implementation safety. Ensure adherence to safe work practices and procedures; provide and/or report any issues or ideas to KWRU Safety Coordinator.
- Provide and/or coordinate technical training on equipment and maintenance (i.e. LMI pumps)
- Evaluate efficiency and effectiveness of equipment and repairs and evaluate equipment conditions and life cycle costs with Utility Management.
- Assist in the review of proposals or purchasing contracts with an eye toward including preventive maintenance, repair, and replacement for wastewater treatment equipment.
- Ensure all service requests are resolved in a proper and complete manner; respond to inquiries in a courteous manner, resolve complaints in an effective and timely manner. Make follow up phone calls to owners/customers when necessary.
- Recommend and assist in the implementation of goals and objectives; implement and/or fully support policies and procedures of the Company (even if you don't agree with every one of them).
- Participate and assist with the preparation and administration of the budget when called upon; assist with project planning; submit budget recommendations and capital improvement recommendations; monitor expenditures.
- Assist with the requisition of supplies and materials for maintenance activities/projects; assist in preparation of specifications for service, materials, and equipment purchases.

Provide information in a courteous manner to any administrative employee who asks you to communicate your work verbally or in written format.

Specific Duties include the following:

- Organize and keep inventory/stock of necessary parts (electrical, airvac, plant, etc)
- Under the direction of Operations Manager, assign daily tasks to crew and prioritize these tasks with Operations Manager
- Ensure the following tasks are done at their scheduled intervals and proper records kept:
    - Quarterly Lift Station Preventative Maintenance
    - Perform Quarterly Plant Maintenance
    - Annual AIRVAC pit/buffer tank maintenance
    - Line cleaning (6 month interval)
    - Annual Backyard survey (prior to hurricane season and more frequently if required)
    - Busch Vacuum Pumps – oil/filters as required by O&M manual
- Act as point person for contractors working onsite to repair or troubleshoot existing equipment (not expansion project)

KW Resort Utilities Corp
6630 Front Street
Key West, FL 33040
305.295.3301
FAX 305.295.0143
www.kwru.com

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VACUUM PUMP #1																															
Visual inspection of pump system																															
Inspect for oil leaks																															
Check oil in sight glass																															
Drain Solberg																															
Drain vacuum line																															
Empty buckets																															
Visual inspection of coupling **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Annual service **DECEMBER**																															
VACUUM PUMP #2																															
Visual inspection of pump system																															
Inspect for oil leaks																															
Check oil in sight glass																															
Drain Solberg																															
Drain vacuum line																															
Empty buckets																															
Visual inspection of coupling **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Annual service **DECEMBER**																															
VACUUM PUMP #3																															
Visual inspection of pump system																															
Inspect for oil leaks																															
Check oil in sight glass																															
Drain Solberg																															
Drain vacuum line																															
Empty buckets																															
Visual inspection of coupling **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Annual service **DECEMBER**																															
VACUUM PUMP #4																															
Visual inspection of pump system																															
Inspect for oil leaks																															
Check oil in sight glass																															
Drain Solberg																															
Drain vacuum line																															
Empty buckets																															
Visual inspection of coupling **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Annual service **DECEMBER**																															

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Visually inspect vent fan																															
Purge Gast Air Compressor																															
Clean Gast A.C. filter **WEEKLY**																															
Drain trunk line **WEEKLY**																															
Clean solberg #1 **WEEKLY**																															
Clean solberg #2 **WEEKLY**																															
Clean solberg #3 **WEEKLY**																															
Clean solberg #4 **WEEKLY**																															
Change vent fan belt **DECEMBER**																															

NORTH PLANT BLOWER #1

Visually inspect blower and motor asm																															
Inspect for oil leaks																															
Discharge temp																															
Discharge pressure																															
Check oil level front sight glass																															
Check oil level back sight glass																															
Check belt tension **WEEKLY**																															
Inspect belts **WEEKLY**																															
Vacuum filters **MONTHLY**																															
Check relief valve operation **MONTHLY**																															
Check check valve operation **MONTHLY**																															
Replace Filters **QUARTERLY**																															
Change oil **JUNE & DECEMBER**																															
Change belts **DECEMBER**																															

NORTH PLANT BLOWER #2

Visually inspect blower and motor asm																															
Inspect for oil leaks																															
Discharge temp																															
Discharge pressure																															
Check oil level front sight glass																															
Check oil level back sight glass																															
Check belt tension **WEEKLY**																															
Inspect belts **WEEKLY**																															
Vacuum filters **MONTHLY**																															
Check relief valve operation **MONTHLY**																															
Check check valve operation **MONTHLY**																															
Replace Filters **QUARTERLY**																															
Change oil **JUNE & DECEMBER**																															
Change belts **DECEMBER**																															

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NORTH PLANT BLOWER #3																															
Visually inspect blower and motor asm																															
Inspect for oil leaks																															
Discharge temp																															
Discharge pressure																															
Check oil level front sight glass																															
Check oil level back sight glass																															
Check belt tension **WEEKLY**																															
Inspect belts **WEEKLY**																															
Vacuum filters **MONTHLY**																															
Check relief valve operation **MONTHLY**																															
Check check valve operation **MONTHLY**																															
Replace Filters **QUARTERLY**																															
Change oil **JUNE & DECEMBER**																															
Change belts **DECEMBER**																															

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NORTH PLANT EQ BLOWER																															
Visually inspect blower and motor asm																															
Inspect for oil leaks																															
Discharge temp																															
Discharge pressure																															
Check oil level front sight glass																															
Check oil level back sight glass																															
Check belt tension **WEEKLY**																															
Inspect belts **WEEKLY**																															
Vacuum filters **MONTHLY**																															
Check relief valve operation **MONTHLY**																															
Check check valve operation **MONTHLY**																															
Replace Filters **QUARTERLY**																															
Change oil **QUARTERLY**																															
Change belts **DECEMBER**																															

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NORTH PLANT CLARIFIER																															
Visually verify rotation																															
Inspect for oil leaks																															
Inspect chain and assembly																															
Change oil **QUARTERLY**																															
Grease upper bearing **QUARTERLY**																															
Grease chain **QUARTERLY**																															

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NORTH PLANT ANOXIC MIXER																															
Verify operation																															
Visually inspect positioning system																															
Reverse rotation **WEEKLY**																															
Grease **QUARTERLY**																															

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NORTH PLANT ANOXIC MIXER																															
Verify operation																															
Visually inspect positioning system																															
Reverse rotation **WEEKLY**																															
Grease **QUARTERLY**																															
RECLAIM WATER PUMP #1																															
Inspect operation																															
Check mechanical seal for operation																															
Visually inspect coupling																															
Check bearing grease **MONTHLY**																															
Grease elecric motor **every 7400 hours**																															

RECLAIM WATER PUMP #2																															
Inspect operation																															
Check mechanical seal for operation																															
Visually inspect coupling																															
Check bearing grease **MONTHLY**																															
Grease elecric motor **every 7400 hours**																															

SOUTH PLANT ROOTS #1																															
Inspect operation																															
Visually inspect belts																															
Check oil level **WEEKLY**																															
Grease end bearings **WEEKLY**																															
Clean filters **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Change air filters **QUARTERLY**																															
Change belts **DECEMBER**																															

SOUTH PLANT ROOTS #2																															
Inspect operation																															
Visually inspect belts																															
Check oil level **WEEKLY**																															
Grease end bearings **WEEKLY**																															
Clean filters **MONTHLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Change air filters **QUARTERLY**																															
Change belts **DECEMBER**																															

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SOUTH PLANT TUTHILL #1																															
Inspect operation																															
Visually inspect belts																															
Check oil level																															
Check belt tension **WEEKLY**																															
Clean filters **WEEKLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Change air filters **QUARTERLY**																															
Change belts **DECEMBER**																															

SOUTH PLANT TUTHILL #2																															
Inspect operation																															
Visually inspect belts																															
Check oil level																															
Check belt tension **WEEKLY**																															
Clean filters **WEEKLY**																															
Grease electric motor **QUARTERLY**																															
Change oil **QUARTERLY**																															
Change air filters **QUARTERLY**																															
Change belts **DECEMBER**																															

SOUTH-EAST PLANT CLARIFIER																															
Visually verify rotation																															
Inspect for oil leaks																															
Inspect chain and assembly																															
Change oil **QUARTERLY**																															
Grease upper bearing **QUARTERLY**																															
Grease chain **QUARTERLY**																															

SOUTH-WEST PLANT CLARIFIER																															
Visually verify rotation																															
Inspect for oil leaks																															
Inspect chain and assembly																															
Change oil **QUARTERLY**																															
Grease upper bearing **QUARTERLY**																															
Grease chain **QUARTERLY**																															

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SOUTH PLANT LAMPSON #1																															
Inspect operation																															
Wash filter WEEKLY																															
Grease bearings (FEB,APRIL,JUNE,AUG, OCT, DEC)																															
Grease motor(FEB,APRIL,JUNE,AUG, OCT, DEC)																															
SOUTH PLANT LAMPSON #2																															
Inspect operation																															
Wash filter WEEKLY																															
Grease bearings (FEB,APRIL,JUNE,AUG, OCT, DEC)																															
Grease motor(FEB,APRIL,JUNE,AUG, OCT, DEC)																															
SOUTH PLANT LAMPSON #3																															
Inspect operation																															
Wash filter WEEKLY																															
Grease bearings (FEB,APRIL,JUNE,AUG, OCT, DEC)																															
Grease motor(FEB,APRIL,JUNE,AUG, OCT, DEC)																															

NORTH PLANT EQ PUMP #1

Oil change **DECEMBER**

NORTH PLANT EQ PUMP #2

Oil change **DECEMBER**

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Maintenance Supervisor

Supervisor in charge of tracking, scheduling, and documenting all preventative maintenance on Wastewater Treatment Plant, Vacuum Station, and entire collection system.

To plan, manage, document, supervise, and oversee the overall maintenance and repair of wastewater facilities and assets (trucks, jet rodder, generators, trash pumps, compressors, etc.). Provide daily supervision over the maintenance and support wastewater facility assets including preventative, breakdown, predictive repairs and/or replacement of wastewater assets. Manage the reliability and maintainability of assets, processes, utilities and facilities considering loss elimination, risk management, and life cycle asset management

Key Responsibilities:

- Perform technical, supervisory, and managerial work directing the overall maintenance and repair of the wastewater treatment plant, vacuum station, lift stations, vacuum pits, buffer tanks and all related valves, controls, and appurtances. Plan, prioritize, assign, supervise, review, and evaluate the work of staff and interface with vendors in the course of maintaining wastewater facilities.
-
- Ensure activities are closely coordinated with WWTP operations staff, purchasing department, engineering, vendors, and contractors as necessary, to minimize disruption of operations and ensure compliance with all applicable federal and state regulations and permits.
- Manage emergency work and the communication of information throughout the activity.
- Ensure planned maintenance is done efficiently, effectively, and complies with planned maintenance schedule. Assist the Utility Vice President with development of the schedule to ensure materials, equipment and personnel are available to perform the work. Assist VP in developing the detailed work plans for preventative maintenance, equipment repair, and replacement, and predictive maintenance programs. Make schedule adjustments as necessary and communicate any schedule revisions.
- Oversee the preventive maintenance, equipment repair and replacement, and predictive maintenance work; track and schedule work assignments, ensure equipment downtime is minimized, direct

maintenance and repairs as needed to ensure operational integrity and regulatory compliance are maintained.

- Mentor and Lead, motivate, develop, and evaluate all personnel assigned to you.
- Be a leader in implementation safety. Ensure adherence to safe work practices and procedures; provide and/or report any issues or ideas to KWRU Safety Coordinator.
- Provide and/or coordinate technical training on equipment and maintenance (i.e. LMI pumps)
- Evaluate efficiency and effectiveness of equipment and repairs and evaluate equipment conditions and life cycle costs with Utility Management.
- Assist in the review of proposals or purchasing contracts with an eye toward including preventive maintenance, repair, and replacement for wastewater treatment equipment.
- Ensure all service requests are resolved in a proper and complete manner; respond to inquiries in a courteous manner, resolve complaints in an effective and timely manner. Make follow up phone calls to owners/customers when necessary.
- Recommend and assist in the implementation of goals and objectives; implement and/or fully support policies and procedures of the Company (even if you don't agree with every one of them).
- Participate and assist with the preparation and administration of the budget when called upon; assist with project planning; submit budget recommendations and capital improvement recommendations; monitor expenditures.
- Assist with the requisition of supplies and materials for maintenance activities/projects; assist in preparation of specifications for service, materials, and equipment purchases.

Provide information in a courteous manner to any administrative employee who asks you to communicate your work verbally or in written format.

Specific Duties include the following:

- Organize and keep inventory/stock of necessary parts (electrical, airvac, plant, etc)

- Under the direction of Operations Manager, assign daily tasks to crew and prioritize these tasks with Operations Manager

- Ensure the following tasks are done at their scheduled intervals and proper records kept:

    - Quarterly Lift Station Preventative Maintenance

    - Perform Quarterly Plant Maintenance

    - Annual AirVac pit/buffer tank maintenance

    - Line cleaning (6 month interval)

    - Annual Backyard survey (prior to hurricane season and more frequently if required)

    - Busch Vacuum Pumps – oil/filters as required by O&M manual

- Act as point person for contractors working onsite to repair or troubleshoot existing equipment (not expansion project)

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Public Wastewater Utility Maintenance Supervisor- Key West

Supervisor in charge of tracking, planning, scheduling, supervising, and documenting all preventative maintenance on a Public Wastewater Treatment Plant, vacuum station, and entire collection system comprised of a vacuum system and a traditional gravity/force main system. Manage a team of direct reports that include mechanics and maintenance technicians. Consult and oversee outside contractors that are brought in to assist with the utility's capital projects and/upgrades or maintenance activities.

Oversee the overall maintenance and repair of wastewater facilities and assets (trucks, heavy equipment, generators, pumps, compressors, blowers, etc.). Provide daily supervision over the maintenance and support wastewater facility assets including preventative, predictive repairs, rehabilitative work or replacement of wastewater assets. Manage the reliability and maintainability of assets, manage utilities and facilities considering loss elimination, risk management, and life cycle asset management.

Must have experience in water/wastewater industry or equivalent knowledge. Wastewater Plant Operator License a bonus. The position requires a valid Driver's License, on-call duties, and the candidate should be capable of lifting 40 lbs. Candidate shall agree to live within a 20 mile radius from the service area to allow candidate to respond to on call duties in a timely fashion.

Position includes company truck, company phone, paid vacation, paid holidays, health benefits including medical/dental/vision, retirement benefits, paid personal time, company paid golf club membership at Key West Golf Course, salary range ($60,000 - $90,000) commensurate with skills and experience.

Key Responsibilities:

- Perform technical, supervisory, and managerial work directing the overall maintenance and repair of the wastewater treatment plant, vacuum station, lift stations, vacuum pits, buffer tanks, etc. Plan, prioritize, assign, supervise, review, and evaluate the work of staff and interface with vendors in the course of maintaining wastewater facilities and infrastructure.
- Ensure activities are closely coordinated with WWTP operations staff, purchasing department, engineering, vendors, and contractors as necessary, to minimize disruption of operations and ensure compliance with all applicable federal and state regulations and permits.
- Manage emergency work and the communication of information throughout the activity.
- Ensure planned maintenance is done efficiently, effectively, and complies with planned maintenance schedule. Assist the Utility VP with development of the schedule to ensure materials, equipment and personnel are available to perform the work. Assist in developing detailed work plans for preventative maintenance, equipment repair, and replacement, and predictive maintenance programs. Make schedule adjustments as necessary and communicate any schedule revisions to the appropriate personnel.

- Oversee the preventive maintenance, equipment repair and replacement, and predictive maintenance work; track and schedule work assignments, ensure equipment downtime is minimized, direct maintenance and repairs as needed to ensure operational integrity and regulatory compliance are maintained.
- Mentor, lead, motivate, develop, and evaluate all direct reports.
- Be a leader and ensure adherence to safe work practices and procedures; provide and/or report concerns to Safety Officer.
- Provide and/or coordinate technical training on equipment and maintenance procedures.
- Evaluate efficiency and effectiveness of equipment periodically with regard to life cycle costs as it relates to new equipment or processes. Provide this information to Utility Management.
- Assist in the review of proposals or purchasing contracts with an eye toward including preventive maintenance or reducing maintenance expense in the operation of equipment and systems, repair of, or replacement of the system or equipment.
- Ensure all service requests are resolved in a proper and complete manner; respond to inquiries in a professional manner, resolve complaints in a timely manner. Follow up phone calls contractors, vendors, and customers when necessary.
- Assist with the requisition of supplies and materials for maintenance activities/projects; assist in preparation of specifications for service, materials, and equipment purchases.
- Provide information to administrative staff as necessary.
- Recommend and assist in the implementation of company goals and objectives; implement and reinforce the policies and procedures of the Utility.
- Participate and assist with the preparation and administration of the budget; assist with project planning; submit budget recommendations and capital improvement recommendations; monitor expenditures and elevate concerns to upper management if necessary.

Please apply at hiring@kwru.com.

Operation and Maintenance Performance Report

Key West Resort Utility Wastewater Treatment Facility

FLA014951

Monroe County

DEP Permit FLA014951

Permit Expiration Date April 10, 2012

Report Prepared by:
Weiler Engineering
201 W Marion Avenue
Suite 1306
Punta Gorda, Florida 33950
941.505.1700

CERTIFICATIONS

I certify that the information contained in this report is, to the best of my knowledge, true and correct; that the report was prepared in accordance with sound engineering principles and I have discussed the recommendations made in this report with the permittee's delegated representative.

The Weiler Engineering Corporation
6805 Overseas Highway
Marathon, Florida 33050

Edward Castle, P. E. 58574

Date

I certify that I have reviewed the information contained n this report and am fully aware of any recommendations and schedules included in the report.

Certified Operator
Mark Burkemper, B-5355

Date

KW Resort Utilities
6630 Front Street
Key West, Florida 33040

I certify that I have reviewed the information contained in this report and am fully aware of any recommendations and schedules included in the report.

Chris Johnson, President
KW Resort Utilities, Corp.
6630 Front Street
Key West, Florida 33040

Date

INTRODUCTION

The Key West Resort Utility (KWRU) wastewater treatment facility is designed to achieve Advanced Wastewater Treatment (AWT) levels, with a permitted capacity of 0.499 million gallons per day (MGD) based on the annual average daily flow (AADF).

The facility is a Category III, Class C; permitted to operate under the authority of FDEP Permit FLA014951. Staffing is by a Class C or higher operator for 6 hours per day, 7 days per week, in compliance with Permit Condition V and applicable DEP rules.

Effluent Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), fecal coliform, pH, Total Nitrogen and Total Phosphorus are monitored pursuant to Permit Condition I.A.1 to determine efficiency of the treatment process.

Influent Total Nitrogen, Total Phosphorus, $CBOD_5$ and TSS are monitored pursuant to Permit Condition I.B.1 to determine loading to the facility.

FACILITY OPERATION

At the facility there is a vacuum building which houses four pumps connected to an auto-dialer that notifies the operator of low vacuum. The building was clean and no visible spills of oil or other fluids were observed.

Collection system influent from both the vacuum and gravity systems flows to a splitter box, which sends flow to the separate treatment trains. The facility is composed of dual plants with design flows of 0.249 MGD and 0.25 MDG, which are piped together to allow the facility to operate as a single plant.

Each treatment train consists of a bar screen, an equalization basin, an aeration tank, an anoxic tank, a re-aeration basin, a clarifier, a sand filter, and a chlorine contact chamber.

From the surge tanks, raw influent is directed to dual aeration basins of equal size where nitrification takes place. There is a sodium bicarbonate feed system to add any required alkalinity in an amount dependant on facility operation. This system will be used when the facility is operated in the AWT mode. Each aeration basin is equipped with multiple air headers and the contents appear to be evenly mixed with no dead spots. The mixed liquor color was good; no odors were present, and a crisp white foam was observed.

When the facility is operated as an AWT facility, nitrified wastewater will be injected with a carbon source as required prior to flowing to the anoxic zone for the denitrification process where a complete mix drives off excess nitrogen gas.

When operated as an AWT facility, the mixed liquor flows from the anoxic basins to the re-aeration basins. In order to achieve phosphorus reduction, the effluent from the re-aeration tanks will be injected with aluminum sulfate.

Currently, the anoxic and re-aeration basins are operating as aeration basins. Flow from each treatment train's aeration basin is delivered to the clarifiers. The stilling wells did not contain excessive solids, and clear water was observed above the blankets; no pop-ups or floating solids seen. Each of the Return Activated Sludge (RAS) and the Waste Activated Sludge (WAS) lines were in the appropriate positions and were functioning properly. The skimmer arms were properly operating. The weirs appeared level and were maintained free of algae.

From the clarifiers, flow is delivered to the back-washable sand filters, which were free of solids or trash and operating properly. Once the water leaves the sand filters, turbidity samples are collected for analysis by the in-line continuous turbidity meter.

The final stage of treatment is the chlorine contact chambers where the required contact time and required high level disinfection is obtained prior to disposal to the reuse system or injection well system. Samples are automatically collected for analysis by a Hach in-line chlorine meter to ensure the total residual chlorine level is at least 1 mg/L.

In accordance with F.A.C. Rule 62-600.300(4)(b), the 6 mg/L chlorine dosage rate was obtained from the Great Lakes/Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997 edition.

The contents of each chlorine contact chamber were clear; no floating material or excessive solids observed. Baffles were in place to minimize short circuiting. It was observed that the gas chlorine cylinders were properly stored.

From the chlorine contact chambers, effluent is discharged to either the reuse system or the injection well system. A Leopold-Stevens meter and totalizer on the effluent tank is used to provide hydraulic loading information for the facility.

The effluent is pumped to reuse storage ponds for slow-rate land application on the golf course at the Key West Golf Club. The Monroe County Detention Center (MCDC) also receives treated wastewater which is used for toilet flushing and cooling water. At the facility there are two ten-inch Class V Group III underground injection wells that provide alternate effluent disposal.

Residuals (WAS) are maintained in the three aerobic digesters for fifteen (15) days and are then put into under-drained drying beds. Residuals are left on the beds for sixty (60) days. When the total solids reach 80%, dried residuals are removed by Waste Management, Inc. and taken to the Medley Landfill and Recycling Center, located at 9350 NW 89th Avenue, Medley, Florida 33178.

The three month average daily flows indicate the facility is operating between 45 and 62% of the permitted capacity of 0.499 MGD.

July2011	0.307	Jan 2011	0.282
Jun	0.302	Dec	0.259
May	0.298	Nov	0.283
Apr	0.295	Oct	0.227
Mar	0.297	Sept	0.245
Feb	0.285	Aug	0.224

Safe and dry access points from which influent and effluent samples are collected are provided.

The facility sends the samples collected as required by Permit Conditions I.A.1, I.B.1, and I.C.1 to US Water in Marathon Florida, Laboratory Certification #E85433, and to Sanders Laboratories Inc., in Nokomis, Florida, Laboratory Certification #E84380. All on-site tests are performed by an operator certified in accordance with FAC Chapter 62-602.

The facility operations staff performs the required duties in a professional, thorough, and competent manner. The log book included the required information regarding facility operation.

PHYSICAL CONDITION

SURGE TANKS:

The facility has dual surge tanks, both of which are in good condition. All influent enters the surge tanks after passing through the manually-cleaned bar screens.

AERATION BASINS:

The facility has dual aeration basins which are in good condition. The contents of each basin were aerating evenly with no dead spots observed.

ANOXIC TANK:

The dual anoxic tanks are in new condition, and when placed into operation, will function as intended.

RE-AERATION BASIN:

The tanks are in new condition and will also operate as intended when placed into service.

CLARIFIERS:

The facility has two circular clarifiers, each is in good condition. The sludge mechanisms and transfer equipment were operating properly.

DIGESTERS:

There are three aerobic digesters; one integrated into each of the treatment trains and a new stand alone digester. All are in good condition, and were aerating evenly with no dead spots observed.

CHLORINE CONTACT CHAMBERS:

There are dual chlorine contact chambers. The contents of each tank were very clear with no accumulated solids observed.

FILTERS:

There are dual sand filters in like new condition after having been repainted and new media installed. The filters were operating properly with no accumulated solids observed.

DISPOSAL SYSTEM:

The dual 10" injection wells are in compliance with current standards. The operator has not reported any problems with the wells during the term of the current permit.

The reuse storage ponds at the Key West Golf Club have a combined surface area of 94,200 ft^2. The ponds were not overgrown and did not contain excessive algae.

The reuse storage system at the Monroe County Detention Center is comprised of three (3) interconnected tanks totaling 102,372 gallons; these tanks are in good condition.

BYPASS/OVERFLOWS:

No evidence of bypass or overflow was observed at the facility or in the operations log book.

OPERATION AND MAINTENANCE PROGRAM

RECORD DRAWINGS and OPERATION AND MAINTENANCE MANUAL:

Current record drawings and the Operation and Maintenance Manual are maintained in the Key West Resort Utility office at 6630 Front Street, Stock Island, Florida 33040.

OPERATION AND MAINTENANCE LOG:

The Operation and Maintenance log is kept at the facility, and is current to the most recent on-site visit by the facility operator.

Map of Facility Location

Location of Facility relative to US 1

WEILER ENGINEERING CORPORATION
WEC xcellence in engineering
201 WEST MARION AVENUE - SUITE 1306 | PUNTA GORDA | FL 33950
TEL 941-505-1700 | FAX 941-505-1702 | WWW.WEILERENGINEERING.ORG

6805 OVERSEAS HIGHWAY | MARATHON | FL 33050
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MEMORANDUM

To: Christopher Johnson

From: Ed Castle, PE

Date: 2 December 2014

Re: Evaluation of Collection Systems Served by KWRU

Introduction

KW Resort Utility engaged the Weiler Engineering Corporation (WEC) to provide a report documenting the quantity, type and condition of the various collection systems connected to the KW Resort Utility Corp. wastewater treatment plant. The reclaimed water transmission system is included in the report

KWRU Owned Systems

Lincoln Gardens Gravity Collection System

The Lincoln Gardens area of South Stock Island consists of a residential area served by a gravity collection system. The gravity mains and manholes are located in the public right of way or in permanent easement granted to the Utility.

The gravity piping is generally vitrified clay. Much of the pipe has been slip-lined with plastic liners, including the gravity laterals. The piping is in good condition. Salinity records show that there is very little saltwater infiltration. Flow records demonstrate that the wet weather inflow and infiltration is limited.

There are three Utility-owned lift stations (discharge into gravity piping) and Utility-owned force main pump stations in the system. The Sunset Trailer Park area discharges into the Lincoln Gardens gravity collection system, using a number of small grinder lift stations.

The gravity collection system consists of approximately:

- 20,525 LF of 8" gravity main
- 300 LF of 10" gravity main
- 53 manholes
- 3,015 LF of 4" gravity service laterals (to property line)

Key West Golf Club Development Gravity Collection System

The Key West Golf Club Development is a residential community located on North Stock Island. It is served by a gravity collection system that discharges to two force main pump stations. The gravity collection system is constructed of PVC and is in new condition. It is located within the common area (streets) of the development.

The gravity collection system consists of approximately:

- 6,282 LF of 8" gravity main
- 662 LF of 6" gravity main
- 36 manholes
- 3,150 LF of 6" gravity lateral (to property line)

South Stock Island Vacuum Collection System

The South Stock Island vacuum collection system serves the remainder of the properties south of US Highway 1 that are not served by the Lincoln Gardens gravity collection system or by the KWRU force main systems. The vacuum system is constructed of PVC piping, fiberglass vacuum pits and concrete buffer tanks. 6" PVC gravity laterals connect properties to the vacuum pits and buffer tanks.

Certain larger properties were provided with a vacuum stub from which privately-owned vacuum collections systems were extended onto the properties. The quantities of privately-owned vacuum collection system piping and pits are not included in the following summary.

The vacuum collection system consist of approximately:

- 13,665 LF of 10" vacuum main
- 4,709 LF of 8" vacuum main
- 5,435 FL of 6" vacuum main
- 844 LF of 4" vacuum main
- 1,660 LF of 3" vacuum service lateral (to vacuum pits)
- 70 vacuum pits
- 13 buffer tanks
- 2,358 LF of 6" gravity lateral (to property line)

The vacuum collection system is operated by vacuum provided from the vacuum pump station located at 6630 Front Street at the KWRU WWTP site. The vacuum collection tank is buried, with adjacent inlet and discharge valve vaults. The submersible sewage pumps are located in the vacuum collection tank, are rail mounted and are readily accessible through two quick-release manways. The vacuum pumps and motor control center are located in an adjacent building. All components are in good condition.

The vacuum pump station consists of:

- One 5,000 gallon vacuum collection tank
- Two 25 HP, 460 V, 3 ϕ, submersible sewage solids-handling pumps
- Four 25 HP, 460 V, 3 ϕ, vacuum pumps

- Motor control center
- Vacuum Station building

Sewage Force Main Systems

The KWRU sewage force main systems consist of force main piping of varying sizes and 10 Utility-owned pump stations. There are approximately 29 privately-owned pump stations connected to the KWRU force main systems. The piping is PVC or HDPE and is in new to good condition and is located in the public right of way and in easements. The quantities of privately-owned force mains are not included in the summary below.

The force main systems consist of approximately:

- 8,110 LF of 8" force main
- 3,636 LF of 6" force main
- 11,085 LF of 4" force main

The sewage pumping stations consist of:

- Pines & Palms Pump Station: Two 5 HP, 480 V, 3 ϕ, submersible solids-handling pumps
- Boyd's Campground Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- Laundromat Lift Station: Two 0.5 HP, 240 V, 1 ϕ, submersible solids-handling pumps
- L2A Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- Forcemain Pump Station: Two 5 HP, 230 V, 3 ϕ, submersible grinder pumps
- L4 Lift Station: Two 0.5 HP, 230 V, 1 ϕ, submersible solids-handling pumps
- L3 Lift Station: Two 0.5 HP, 230 V, 1 ϕ, submersible solids-handling pumps
- L1 Lift Station: Two 0.5 HP, 230 V, 3 ϕ, submersible solids-handling pumps
- MCDC Main Pump Station: Two 15 HP, 460 V, 3 ϕ, submersible solids-handling pumps
- Golf Course Main Pump Station: Two 5 HP, 408 V, 3 ϕ, submersible grinder pumps

Reclaimed Water Mains

The KWRU reclaimed water transmission system pumps reclaimed water to the Key West Golf Club, the Monroe County Detention Center and has recently been extended to the Lower Florida Keys Medical Center, Gerald Adams elementary school and the Florida Keys Community College. The transmission mains are constructed of PVC and HDPE pipe and are in new to good condition. The piping is located in the public right of way and in easements.

There are two Utility-owned reclaimed water pumping stations. The main pumping station is located at the KWRU WWTP at 6630 Front Street. This pump station is in good condition. The secondary pump station is located adjacent to the reclaimed water storage pond on the Key West Golf Club. The secondary pump station withdraws

reclaimed water from the 8" transmission main upstream of the discharge into the storage pond. It pumps reclaimed water to the Monroe County Detention center and other users on North College Road. The secondary pump station is in new condition.

The reclaimed water transmission system consists of approximately:

- 8,150 LF of 8" transmission main
- 4,525 LF of 4" transmission main
- 16 LF of 3" transmission main

The reclaimed water pumping stations consist of:

- Main Pump Station: Two 40 HP, 460 V, 3 ϕ, dry-well water pumps
- Golf Course Pond Pump Station: Two 2 HP, 230 V, 3 ϕ, submersible water pumps

Maintenance

Service intervals

Intervals	Item	Date	Hours
Every 50 hrs See Note	Check of fuel pipes and clamp bands Change of engine oil (depending on oil pan) Cleaning of air cleaner element		
Every 100 hrs	Cleaning of fuel filter #3001+3390 3/16/05 Check of battery electrolyte level Check of fan belt tightness		
Every 200 hrs	Check of radiator hoses and clamp[bands Replacement of oil filter cartridge (except V2203-D1-B), using standard oil pan		
Every 400 hrs	Replacement of oil filter cartridge (except V2203-D1-B only), using standard oil pan Replacement of fuel filter cartridge		
Every 500 hrs	Removal of sediment in fuel tank Cleaning of water jacket (radiator interior) Replacement of fan belt		
Every one or two months	Recharge of battery		
Every year or 6 cleaning of air cleaner	Replacement of air cleaner element		
Every 800 hrs	Check of valve clearance		
Every two years	Change of radiator coolant L.L.C. Replacement of battery Replacement of radiator hoses and clamp bands Replacement of fuel pipes and clamp bands		

Note: Change interval of engine oil

ATTACHMENT 8

KWRU RESPONSE TO CITIZENS' INTERROGATORY NO. 90

PRO FORMA PLANT – NO BIDS

~~REF#CR764629355 for outages that were documented by KWRU on January 10th and 25th. As a result of service ticket #045504623 Comcast sent service technicians to the property on President's Day, February 19, 2018 where they met with the KWRU President Chris Johnson. The service technicians checked the service and found the aerial drop to the property needed to be replaced. Since the aerial drop was replaced, KWRU has had continuous service. With acceptable service restored, KWRU continued to work with the Comcast Billing and Collections Group to settle the account and bring it current. Florence Anderson, Comcast Billing Representative, then awarded a $20.00 credit on February 26, 2018. KWRU has settled the past outages in terms of credits as of February 26, 2018, and has brought the Comcast bill current. The service disconnection order was revoked.~~

90. Pro Forma Project. For each pro forma plant addition included on A-3 that the company did not utilize a bidding process for, please provide an explanation why a bidding process was not used.

RESPONSE:

Lift Station L2A: KWRU bid the sister lift station of L2A (Force Main Lift Station), which has the same design as L2A and is located within 300 feet of L2A, to B&L Beneway and Wharton Smith. B&L Beneway was substantially less expensive, as a result of their local labor force and lack of need for housing, and was awarded the bid.

KWRU requested bids for the L2A Lift Station from B&L Beneway and Wharton Smith, containing the same scope of work as for the previously bid Force Main Lift Station. When Wharton Smith was told that B&L Beneway would be bidding on the L2A Lift Station, they declined to proffer a bid, ostensibly believing they could not be competitive with the local B&L Beneway.

Wastewater Treatment Plant Rehabilitation: The rehabilitation was sole sourced to Evoqua, which had originally designed and fabricated the treatment plant. This project was not bid as a result of the recommendation of KWRU's Professional Engineer Ed Castle of Weiler Engineering Corp. Evoqua was in a unique position to understand the scope of work and the particular needs

of the individual plant. *See* document "PSC POD 13 Evoqua Sole Source.pdf", previously produced in this action.

Sludge Drying Beds: KWRU served as general contractor to save expenses, and selected subcontractors based on price quotations. Low bids for silica sand and rock material and shipping were selected, and the contractor with the lowest cost and a vacuum truck was selected for labor.

Telephone System: The telephone system also encompasses fiber to run voice and data services, in order to operate KWRU's crucial SCADA (supervisory control and data acquisition) system, which pushes alarms to KWRU's on-call staff via internet. AT&T and Comcast are the only large-scale providers for these services, and AT&T is the only company with a viable alternative for KWRU's location, as no other company will provide fiber service. While various smaller providers are available, these companies operate pursuant to lease agreements with larger telecommunications companies, and do not have a proven track record of service. Given the mission-critical nature of the SCADA system, KWRU utilized AT&T, to reduce the possibility of service interruptions and reliability problems.

Office Structures and Improvements: As discussed in response to Interrogatory 85, above, PP Keys 2016, LLC is already performing modular construction work in the area. PP Keys 2016, LLC has a proven track record of completion over a recent timetable without frivolous change orders. Due to their volume purchasing power (as a result of ongoing projects) and their relationships with modular manufacturers, KWRU determined the utilization of PP Keys 2016, LLC provided the best chance of providing a suitable unit, at a low price, in the shortest period of time.

All other projects: All other listed projects were competitively bid.

~~91. Capital Expenditures. Please identify the budgeted capital expenditures for each of the calendar years 2013, 2014, 2015, 2016, and 2017 and the actual capital expenditures for each of the calendar years 2013, 2014, 2015, 2016, and 2017.~~

~~**RESPONSE:** The breakdown of budgeted and actual is as follows:~~

~~2015:~~

~~Structures & Improvements: ACTUAL= $620,619 Budgeted $600,000~~

~~Power Gen Equip: ACTUAL= $9,286 Budgeted $2,000 500 gal fuel tank~~

~~Collect Sewer Force: ACTUAL= $2,400 Budgeted $3,882~~

ATTACHMENT 9

KWRU RESPONSE TO CITIZENS' INTERROGATORY NO. 139

PREVENTIVE MAINTENANCE PLAN

~~**RESPONSE:**~~

~~As to portion (a) of the Interrogatory, Comcast is currently operating the service. Comcast took several months after Hurricane Irma to bring the voice and data to operational status. Outages continued into 2018, and KWRU has had to switch all phone services to its answering service in Miami on several occasions.~~

~~As to portion (b) of the Interrogatory, KWRU is currently paying for Comcast, and is working on obtaining a refund for the AT&T fiber circuit, as the circuit was only capable of handling data and KWRU requires a voice and data solution. AT&T has stated that it can provide voice and data, but it must first cancel the "data only" services before the voice and data services can be set up. KWRU pays AT&T only for a single POT (basic copper telephone) line for the vacuum station auto-dialer. AT&T charged a $75.00 set up fee, and the monthly charge for this service is $89.00.~~

~~As to portion (c) of the Interrogatory, only two companies, AT&T and Comcast, provide service to the area which meets KWRU's needs. Only AT&T will provide fiber, which is considered to be the most reliable connection method. Various smaller providers are available, but these companies operate pursuant to lease agreements with larger telecommunications companies, and do not have a proven track record of service. Given the critical nature of the SCADA system KWRU engaged AT&T. KWRU plans to install fiber voice and data service from AT&T, and based on quality of service will determine whether Comcast back-up is necessary.~~

139. Maintenance. Please describe the utility's preventive maintenance plan(s) as well as how it proactively schedules maintenance, repair, refurbishments, and/or replacement activities for utility plant investments.

RESPONSE: KWRU's Maintenance Supervisor is responsible for reviewing all operation and maintenance manuals provided by contractors, engineers, and manufacturers. These manuals include the recommended maintenance schedules, as well as spare part inventory, for proper preventative maintenance. The Maintenance Supervisor keeps a log of all

maintenance performed and the scheduling of preventative maintenance such as oil changes, filter replacements, etc., to ensure service coincides with the manufacturers' recommendations. Since the treatment plant expansion, the Maintenance Supervisor has created an Excel spreadsheet which is used for tracking maintenance on all components related to the plant. The Vice President and Maintenance Supervisor have regular meetings to review recently performed activities and to discuss upcoming projects. The Maintenance and Lead Operator have a daily meeting to discuss that day's maintenance and discuss any maintenance concerns that may arise from an operational perspective.

The Maintenance Supervisor meets with KWRU's officers monthly to discuss routine maintenance activities and larger maintenance plans in the context of personnel assignment, parts and materials procurement, equipment availability, and scheduling.

KWRU management meets on an as-needed basis with professional engineers to discuss capital asset rehabilitation and replacement and other asset maintenance activities involving an engineering component. KWRU receives periodic reports and evaluations from its engineers which document the assets and their condition(s). The purpose of these meetings is to maximize cost savings. For example, as part of the plant expansion, KWRU determined to directly purchase SWECO static screens, chemical skids, chemical tanks, and plant instrumentation to avoid the mark-up included by the general contractor.

KWRU management also presents large scale maintenance, repair, refurbishment, and replacement activities at the annual meeting of KWRU's Board of Directors. Management additionally discusses larger projects with the Directors on an as-needed basis.

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- Ballasted High-Rate Clarifiers

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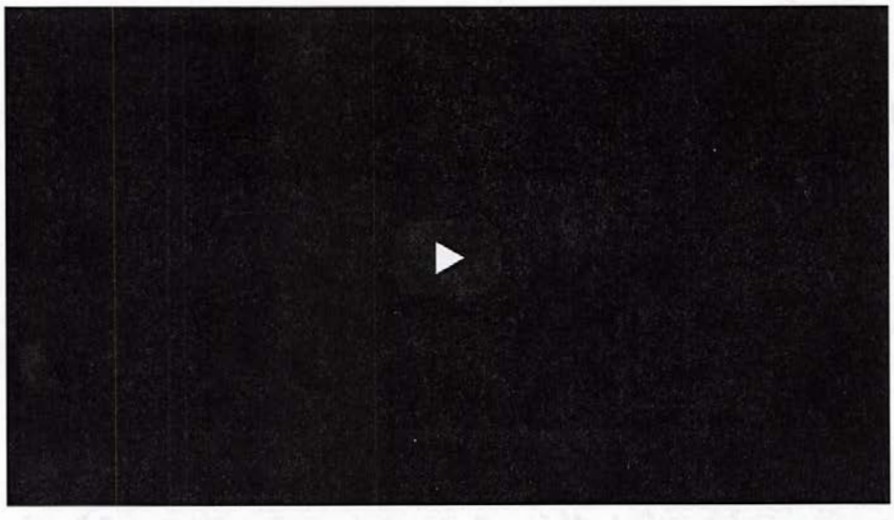

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- Piping
- Electric & controls
- Sitework

Utilities, Inc.

BID INFORMATION AND BUDGET BREAKDOWN

Have three bids been received?

If not, why? List and provide amounts below

Bid	Company	Amount	Selected
1	Evoqua	$1,526,000	Yes
2	ECO-2000	$1,704,000	No
3	FEC	$1,695,555	No

Component:	Amount	
Value Bid Elements	1,526,000.00	should match selected bid(s) above
Engineering		
Direct Purchase of Parts / Materials		
Landscaping / Site Restoration		
Other Components (specify):		
Cap Time		
Remove Debris/Clean/Pressure Wash Interior	158,850.00	
7% Tax	117,940.00	
ECO-2000 Change Order #1	10,534.00	
Change Order #2 - Shelley's Sludge Removal	24,000.00	

Total Project Budget **1,837,324.00** should match Total Budget on General Information

Object Account(s) to which project will be closed:

1300	Struct/Imprv Treat Plt
	select from dropdown list
	select from dropdown list
	select from dropdown list
	select from dropdown list

Go to Reference List

General Comments:

The removal of rags, debris, grit, sand, rags and pressure cleaning is estimated at 200 CY of material. The cost above in the amount of $158,850.00 is from a bid received by ECO-2000. This type of task is very much a niche market where other bidders were not available.

BUDGET PROPOSAL

Evoqua Water Technologies Inc.
1828 METCALF AVE
THOMASVILLE, GA 31792

TELEPHONE 229-227-8736
FACSIMILE 229-228-0312

TO	**Bryan Gongre**	**CC**	**Earl Griner**	**P#160124-A0 Rev. 0**
E-mail	**BKGongre@uiwater.com**	**Phone**		
FROM	**Bill Knisely**	**DATE**	**03/02/2026**	**PAGE 1 OF 8**

SUBJECT Wekiva WWTP Rehab

Note: The scope of supply and pricing are based on EVOQUA standard equipment selection, wage rates, standard terms of sale and warranty terms. Any variations from these standards may affect this budgetary proposal. Additionally, please note that this budgetary proposal is for review and informational purposes only and does not constitute an offer for acceptance.

Budget Price for Equipment/Materials, Demolition, Installation & Field Paint for Wekiva WWTP's #1, #2, & #3 F.O.B. Thomasville, Georgia. Freight allowed is **$1,526,000.00.** Taxes not included.

General Description: Provide materials and equipment to rehab three (3) existing WWTP's. All WWTP's have a 116'-0" diameter outer wall and 60'-0" clarifier. Plants #1 & #3 have steel outer walls and Plant #2 is concrete. Components and materials will be delivered by Evoqua for installation by Evoqua. Evoqua is not responsible for the repair or structural design of the existing concrete.

SCOPE OF SUPPLY WWTP #3:

- Provide and install new drive assembly and controls to match what we furnished on Plant #1.
- Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8" thick 304SS weir plates, hardware and seal tape.
- Provide and install all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.

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- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc…
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 6” diameter center shaft.
- Furnish and install new aluminum handrails on outside of peripheral walkway.
- Provide and install 1/8” aluminum splash plate to go under the walkway.
- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Provide and install approx. 40’ outer wall trim angle, 3/8” x 3” x 3”, rolled leg in to replace existing as needed in aeration 1 zone.
- Furnish and install new 304SS unistruct to support water lines, chlorine lines conduit etc. as required.
- Furnish and install approx. 40’ of 10” channel to replace channel on top of bulkhead as needed.
- Furnish and install bent plate 6” x 1 ½” to replace peripheral toe plates as required.
- Furnish and install 8” channel to replace existing peripheral walkway supports as needed.
- Furnish and install 3” x 2” x ¼” angle to replace existing peripheral walkway supports as needed.
- Furnish and install 2 ½” steel pipe to replace existing air header supports as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 2 light support brackets. Locate same location as existing lights.
- Furnish and install 27’ long section of walkway to replace section from concrete structure to plant #3. Include 3’ x 3’ walkway off to side for accessing and cleaning influent bar screen to be included. Existing aluminum grating will be reused.
- Furnish and install approx. 200’ of aluminum handrails and toe plates to run from plant #3 to walkway between plant #1 & #2.
- Replace 8” walkway beams on walkway that ties into concrete structure and runs to interconnecting walkway between plants #1 and #2.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100’ of trough that was used in the contact stabilization mode. Patch holes in bulkheads where trough went thru.

BUDGET PROPOSAL

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- Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
- Repair gaps between outer wall and outer wall trim channel. Approx. 20' of welding required.
- Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistruct.
- Furnish and install all new 1" chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.
- Remove 3 channels on walkway between plant 3# and interconnecting walkway between plant #1 & #2.
- Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
- Sweep blast and paint interior with 16 mils coal tar epoxy.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

SCOPE OF SUPPLY WWTP #2:

- Provide and install new drive assembly and controls to match what we furnished on Plant #1.
- Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8" thick 304SS weir plates, hardware and seal tape.
- Provide and stall all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.
- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 4" diameter center shaft.
- Provide and install 1/8" aluminum splash plate to go under the peripheral walkway.

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- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Furnish and install 304SS unistruct to support water lines, chlorine lines conduit etc. as required.
- Furnish and install material to replace top 48" of two bulkheads, one between digester & aeration 3 and one between aeration 2 & 3.
- Furnish and install bent plate 6 1/2" x 1 ½" to replace peripheral toe plates as required.
- Furnish and install 4" channel to replace existing peripheral walkway supports as needed.
- Furnish and install 2"x 2" x ¼" angle to replace existing peripheral walkway supports as needed.
- Furnish and install 2 ½" pipe to replace existing air header supports as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 1 light support bracket. Locate same location as existing light.
- Furnish and install 3 new support brackets for aluminum influent trough where original brackets were installed.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100' of trough that was use in the contact stabilization mode.
- Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
- Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistruct.
- Furnish and install all new 1" chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.
- Remove 10' pipe that is not being used in the CL2 zone.
- Install 1 new LED double headed light assembly. Same as on exiting new EQ tank.
- Sweep blast and paint interior with 16 mils coal tar epoxy. Paint top 4' of the interior concrete outer wall.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

SCOPE OF SUPPLY WWTP #1:

- Provide and install new steel weir trough and scum baffle assemblies with drop box and 18" thick 304SS weir plates, hardware and seal tape.
- Provide and stall all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever

BUDGET PROPOSAL

Evoqua Water Technologies Inc.
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operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.

- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 6" diameter center shaft.
- Furnish and install all new aluminum grating, handrails and toe plates on peripheral walkway.
- Furnish and install 3" x 3" x ¼" angle for center support on peripheral walkway grating.
- Provide and install aluminum splash plate to go under the walkway.
- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Provide and install approx. 100' outer wall trim angle, 3/8" x 3" x 3" angle rolled leg in to replace existing as needed in aeration 1 zone.
- Furnish and install approx. 100' of 18" x ¼" steel plate to replace top of outer wall in aeration zone 1.
- Furnish and install 304SS unistruct to support water lines, chlorine lines conduit etc. as required.
- Furnish and install approx. 40' of 10" channel to replace channel on top of bulkhead as needed.
- Furnish and install bent plate 8" x 3" to replace peripheral toe plates as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 2 light support brackets. Locate same location as existing lights.
- Furnish and install 34' long section of walkway to replace section from Plant 2 to Plant 1.
- Furnish and install aluminum handrails and toe plates for bridge walkway across clarifier and part of walkway to outer wall.
- Furnish and install new aluminum grating for bridge walkway across clarifier and part of walkway to outer wall.
- Furnish and install 3" x 2" x ¼" angle to support aluminum grating as required.
- Furnish and install 3 new support brackets for aluminum influent trough.

BUDGET PROPOSAL

Evoqua Water Technologies Inc.
1828 METCALF AVE
THOMASVILLE, GA 31792

TELEPHONE 229-227-8736
FACSIMILE 229-228-0312

- Furnish and install additional support channels and kicker on bulkhead between aeration 3 and digester consisting of two 15” channels x 30’ long and 20’ of 12” I-beam to be used as a kicker. Plate and anchors to be included.
- Furnish and install new aluminum handrails on existing stairway.
- Furnish and install new aluminum grating and required support steel for 36” x 36” stairway landing.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100’ of trough that was use in the contact stabilization mode.
- Furnish and install all new 2” sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistruct.
- Furnish and install all new 1” chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.
- Remove 54” x 54” opening rails and grating on walkway between plant and close walkway opening with new handrails.
- Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
- Sweep blast and paint interior with 16 mils coal tar epoxy.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

GUARANTEE:

- One (1) year from date of acceptance not to exceed eighteen (18) month from date of shipment.

ERECTION SCOPE:

Evoqua proposes to furnish labor, equipment and expendable materials to erect the equipment purchased on Evoqua Proposal Number 160124-A0.

- Customer is responsible to having the tanks drained and clean before Evoqua arrives on site.
- Evoqua is responsible for offloading the equipment supplied by Evoqua.
- All materials and equipment being removed by Evoqua during demolition to be disposed of on site.
- Evoqua is responsible for installing supplied accessories and/or equipment by normal fabrication and welding procedures.

BUDGET PROPOSAL

Evoqua Water Technologies Inc.
1828 METCALF AVE
THOMASVILLE, GA 31792

TELEPHONE 229-227-8736
FACSIMILE 229-228-0312

- Evoqua is responsible for providing the necessary construction equipment for erection (crane, welding machines, cutting equipment, etc.).

- Work hours by Evoqua Water Technologies LLC at the site shall be as determined by Evoqua Water Technologies LLC. The purchaser shall not define working hours, number of work days per week or prohibit Evoqua Water Technologies LLC from working evenings, weekends, holidays, etc., when deemed to be advisable by Evoqua Water Technologies LLC General Terms and Conditions for Erection Work document is included as part of this proposal.

FIELD CORROSON PROTECTION NOTES:

1. **Field painting cannot be performed in inclement weather or when temperatures are below 45º F. Evoqua will not be responsible for delays in the project due to the weather conditions.**
2. **Due to the unknown integrity of the existing coating, and should additional blasting other than sweep blasting on existing steel be required, the customer will be responsible for any additional cost. The additional cost will be approved by customer before work is done.**

ADDITIONAL REPAIR NOTE:

1. **There may be other items in need of repair that are not known at this time. Evoqua will give customer a quote for any additional repairs before work is to be done.**

NOT BY EVOQUA:

- Concrete or grout work
- Submittals
- Start-up
- Bypassing of plants during rehab
- Interconnection field piping of any kind
- Drain valves
- Any work on blowers
- Draining and cleaning of tanks
- Disinfection equipment

BUDGET PROPOSAL

Evoqua Water Technologies Inc.
1828 METCALF AVE
THOMASVILLE, GA 31792

TELEPHONE 229-227-8736
FACSIMILE 229-228-0312

- Any items not attached to the plant
- Taxes, Permits, Bonds
- Any other equipment or items not expressly mentioned in this proposal

FUSION® TANKS & SILOS
Authorized Distributor

PROPOSAL

March 28, 2016

To: Sanlando Utilities Corp.
200 Weathersfield Ave.
Altamonte Springs, FL 32714

Attn: Bryan Gongre

Re: Wekiva WWTF Rehabilitation Project

Florida Environmental Construction, Inc. will provide all material, equipment and labor to complete each item as per your attached scope with the following notes and exceptions:

- All items being demolished or removed are to be disposed of onsite.
- Any additional items that are not covered in the scope that result in additional costs are not included.
- The following items are by others:
  - Draining and cleaning of tanks.
  - Concrete and grout work.
  - Start-up
  - Any bypassing of plants.
  - Taxes, permits and bonds.

TOTAL PRICE $ 1,695,555.00

Proposal valid for 30 days from above date.

Submitted by: *Robert Lightsey*
Florida Environmental Const., Inc.
Date: 3/28/16

Accepted by: _____
Sanlando Utilities Corp.
Date: _____

P.O. #: _____

Bus. Unit #: _____

FLORIDA ENVIRONMENTAL CONSTRUCTION, INC.
PO BOX 305
HOWEY IN THE HILLS, FL 34737
PH: (352) 241-4756 ; FAX: (352) 241-9716

Utilities, Inc.

WEKIVA WWTF REHABILITATION PROJECT

General Description: Provide materials and equipment to rehab three (3) existing WWTP's. All WWTP's have a 116'-0" diameter outer wall and 60'-0" clarifier. Plants #1 & #3 have steel outer walls and Plant #2 is concrete.

SCOPE OF SUPPLY WWTP #3:

- Provide and install new drive assembly and controls to match what we furnished on Plant #1.
- Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8" thick 304SS weir plates, hardware and seal tape. Provide and install all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.
- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc...
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 6" diameter center shaft.
- Furnish and install new aluminum handrails on outside of peripheral walkway.
- Provide and install 1/8" aluminum splash plate to go under the walkway.
- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Provide and install approx. 40' outer wall trim angle, 3/8" x 3" x 3", rolled leg in to replace existing as needed in aeration 1 zone.
- Furnish and install new 304SS unistrut to support water lines, chlorine lines conduit etc. as required.
- Furnish and install approx. 40' of 10" channel to replace channel on top of bulkhead as needed.
- Furnish and install bent plate 6" x 1 ½" to replace peripheral toe plates as required.
- Furnish and install 8" channel to replace existing peripheral walkway supports as needed.
- Furnish and install 3" x 2" x ¼" angle to replace existing peripheral walkway supports as needed.
- Furnish and install 2 ½" steel pipe to replace existing air header supports as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 2 light support brackets. Locate same location as existing lights.
- Furnish and install 27' long section of walkway to replace section from concrete structure to plant #3. Include 3' x 3' walkway off to side for accessing and cleaning influent bar screen to be included. Existing aluminum grating will be reused.
- Furnish and install approx. 200' of aluminum handrails and toe plates to run from plant #3 to walkway between plant #1 & #2.
- Replace 8" walkway beams on walkway that ties into concrete structure and runs to interconnecting walkway between plants #1 and #2.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100' of trough that was used in the contact stabilization mode. Patch holes in bulkheads where trough went thru.

- Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
- Repair gaps between outer wall and outer wall trim channel. Approx. 20' of welding required.
- Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
- Furnish and install all new 1" chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.
- Remove 3 channels on walkway between plant 3# and interconnecting walkway between plant #1 & #2.
- Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
- Sweep blast and paint interior with 16 mils coal tar epoxy.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

SCOPE OF SUPPLY WWTP #2:

- Provide and install new drive assembly and controls to match what we furnished on Plant #1.
- Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8" thick 304SS weir plates, hardware and seal tape.
- Provide and stall all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.
- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 4" diameter center shaft.
  Provide and install 1/8" aluminum splash plate to go under the peripheral walkway.
- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Furnish and install 304SS unistrut to support water lines, chlorine lines conduit etc. as required.
- Furnish and install material to replace top 48" of two bulkheads, one between digester & aeration 3 and one between aeration 2 & 3.
- Furnish and install bent plate 6 1/2" x 1 ½" to replace peripheral toe plates as required.
- Furnish and install 4" channel to replace existing peripheral walkway supports as needed.
- Furnish and install 2"x 2" x ¼" angle to replace existing peripheral walkway supports as needed.
- Furnish and install 2 ½" pipe to replace existing air header supports as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 1 light support bracket. Locate same location as existing light.
- Furnish and install 3 new support brackets for aluminum influent trough where original brackets were installed.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100' of trough that was use in the contact stabilization mode.
- Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
- Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
- Furnish and install all new 1" chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.
- Remove 10' pipe that is not being used in the CL2 zone.

- Install 1 new LED double headed light assembly. Same as on exiting new EQ tank.
- Sweep blast and paint interior with 16 mils coal tar epoxy. Paint top 4' of the interior concrete outer wall.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

SCOPE OF SUPPLY WWTP #1:

- Provide and install new steel weir trough and scum baffle assemblies with drop box and 18" thick 304SS weir plates, hardware and seal tape.Provide and stall all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.
- Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
- Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
- Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
- Furnish and install new skimmer arm assembly for a 6" diameter center shaft.
- Furnish and install all new aluminum grating, handrails and toe plates on peripheral walkway.
- Furnish and install 3" x 3" x ¼" angle for center support on peripheral walkway grating.
- Provide and install aluminum splash plate to go under the walkway.
- Furnish and install new effluent overflow weir box in CL2, 304SS construction.
- Furnish and install grating clips with self-tapping screws.
- Provide and install approx. 100' outer wall trim angle, 3/8" x 3" x 3" angle rolled leg in to replace existing as needed in aeration 1 zone.
- Furnish and install approx. 100' of 18" x ¼" steel plate to replace top of outer wall in aeration zone 1.
- Furnish and install 304SS unistruct to support water lines, chlorine lines conduit etc. as required.
- Furnish and install approx. 40' of 10" channel to replace channel on top of bulkhead as needed.
- Furnish and install bent plate 8" x 3" to replace peripheral toe plates as required.
- Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
- Furnish and install 2 light support brackets. Locate same location as existing lights.
- Furnish and install 34' long section of walkway to replace section from Plant 2 to Plant 1.
- Furnish and install aluminum handrails and toe plates for bridge walkway across clarifier and part of walkway to outer wall.
- Furnish and install new aluminum grating for bridge walkway across clarifier and part of walkway to outer wall.
- Furnish and install 3" x 2" x ¼" angle to support aluminum grating as required.
  Furnish and install 3 new support brackets for aluminum influent trough.
- Furnish and install additional support channels and kicker on bulkhead between aeration 3 and digester consisting of two 15" channels x 30' long and 20' of 12" I-beam to be used as a kicker. Plate and anchors to be included.
- Furnish and install new aluminum handrails on existing stairway.
- Furnish and install new aluminum grating and required support steel for 36" x 36" stairway landing.
- Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
- Remove approx.100' of trough that was use in the contact stabilization mode.
- Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
- Furnish and install all new 1" chlorine line.
- Remove any items on plant that are not being used, like old support brackets, piping etc.

- Remove 54" x 54" opening rails and grating on walkway between plant and close walkway opening with new handrails.
- Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
- Sweep blast and paint interior with 16 mils coal tar epoxy.
- Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.

GUARANTEE:

- One (1) year from date of acceptance not to exceed eighteen (18) month from date of shipment.

ECO-2000, INC
P.O. BOX 2275
Bushnell, FL
Office: (352) 793-5060
Fax: (352) 793-9074

PROPOSAL:

Utilities Inc. of Florida
Attention: Bryan Gongre
Wekiva WWTP Rehabilitation Project

SCOPE OF SUPPLY WWTP #3
Provide and install new drive assembly and controls to match what we furnished on Plant #1.
Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8" thick 304SS weir plates, hardware and seal tape. Provide and install all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers
Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc…
Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
Furnish and install new skimmer arm assembly for a 6" diameter center shaft.
Furnish and install new aluminum handrails on outside of peripheral walkway.
Provide and install 1/8" aluminum splash plate to go under the walkway.
Furnish and install new effluent overflow weir box in CL2, 304SS construction.
Furnish and install grating clips with self-tapping screws.
Provide and install approx. 40' outer wall trim angle, 3/8" x 3" x 3", rolled leg in to replace existing as needed in aeration 1 zone.
Furnish and install new 304SS unistrut to support water lines, chlorine lines conduit etc. as required.
Furnish and install approx. 40' of 10" channel to replace channel on top of bulkhead as needed.
Furnish and install bent plate 6" x 1 ½" to replace peripheral toe plates as required.
Furnish and install 8" channel to replace existing peripheral walkway supports as needed.
Furnish and install 3" x 2" x ¼" angle to replace existing peripheral walkway supports as needed.
Furnish and install 2 ½" steel pipe to replace existing air header supports as required.
Furnish and install 2 plates to repair bulkhead wall where contact trough is removed
Furnish and install 2 light support brackets. Locate same location as existing lights.
Furnish and install 27' long section of walkway to replace section from concrete structure to plant #3. Include 3' x

3’ walkway off to side for accessing and cleaning influent bar screen to be included. Existing aluminum grating will be reused.
Furnish and install approx. 200’ of aluminum handrails and toe plates to run from plant #3 to walkway between plant #1 and #2.
Replace 8” walkway beams on walkway that ties into concrete structure and runs to interconnecting walkway between plants #1 and #2
Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
Remove approx.100’ of trough that was used in the contact stabilization mode. Patch holes in bulkheads where trough went thru.
Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
Repair gaps between outer wall and outer wall trim channel. Approx. 20’ of welding required.
Furnish and install all new 2” sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
Furnish and install all new 1” chlorine line.
Remove any items on plant that are not being used, like old support brackets, piping etc.
Remove 3 channels on walkway between plant 3# and interconnecting walkway between plant #1 & #2.
Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
Sweep blast and paint interior with 16 mils coal tar epoxy.
Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.
SCOPE OF SUPPLY WWTP #2
Provide and install new drive assembly and controls to match what we furnished on Plant #1.
Provide and install new steel weir trough and scum baffle assemblies with drop box and 1/8” thick 304SS weir plates, hardware and seal tape.
as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe
Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
Furnish and install new skimmer arm assembly for a 4” diameter center shaft.
Provide and install 1/8” aluminum splash plate to go under the peripheral walkway.
Furnish and install new effluent overflow weir box in CL2, 304SS construction.
Furnish and install grating clips with self-tapping screws.
Furnish and install 304SS unistrut to support water lines, chlorine lines conduit etc. as required.
Furnish and install material to replace top 48” of two bulkheads, one between digester & aeration 3 and one between aeration 2 & 3.
Furnish and install bent plate 6 1/2” x 1 ½” to replace peripheral toe plates as required.
Furnish and install 4” channel to replace existing peripheral walkway supports as needed.
Furnish and install 2”x 2” x ¼” angle to replace existing peripheral walkway supports as needed.

□ Furnish and install 2 ½" pipe to replace existing air header supports as required.
□ Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
□ Furnish and install 1 light support bracket. Locate same location as existing light.
□ Furnish and install 3 new support brackets for aluminum influent trough where original brackets were installed.
□ Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough
□ Remove approx.100' of trough that was use in the contact stabilization mode.
□ Existing walkway grating and splash plates to be removed and re-installed for blasting and painting.
□ Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
□ Furnish and install all new 1" chlorine line.
□ Remove any items on plant that are not being used, like old support brackets, piping etc.
□ Remove 10' pipe that is not being used in the CL2 zone.
□ Install 1 new LED double headed light assembly. Same as on exiting new EQ tank.
□ Sweep blast and paint interior with 16 mils coal tar epoxy. Paint top 4' of the interior concrete outer wall.
□ Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade.
SCOPE OF SUPPLY WWTP #1
□ Provide and install new steel weir trough and scum baffle assemblies with drop box and 18" thick 304SS weir plates, hardware and seal tape.Provide and stall all new 2 ½" diameter 304SS diffusers drop pipe assemblies in the aeration zones and digester. Number drop pipes to be as are existing in Plant #2. Each diffuser drop pipe assembly shall consist of a union to allow ease of removal, a lever operated ball valve accessible from the walkway for the purpose of shut off and regulation of air supply, and the necessary pipe and fittings. The drop pipe assembly to be of sch 10 304SS with 304SS wide band coarse bubble diffusers.
□ Furnish and install new supernatant pump assembly on guide rails with pump hoist and flex hose discharge. A manual on / off switch to be included mounting on handrails near pump hoist.
□ Furnish and install new 304SS Sludge return box with steel airlift pipe assembly, air supply valve hose etc.
□ Furnish and install new 304SS Sludge waste box with steel airlift pipe assembly, air supply valve hose etc.
□ Furnish and install new 304SS scum trough assembly with steel discharge piping, supports as required and auto scum. The new trough will not extend into the existing stilling well.
□ Furnish and install new skimmer arm assembly for a 6" diameter center shaft.
□ Furnish and install all new aluminum grating, handrails and toe plates on peripheral walkway.
□ Furnish and install 3" x 3" x ¼" angle for center support on peripheral walkway grating.
□ Provide and install aluminum splash plate to go under the walkway.
□ Furnish and install new effluent overflow weir box in CL2, 304SS construction.
□ Furnish and install grating clips with self-tapping screws.
□ Provide and install approx. 100' outer wall trim angle, 3/8" x 3" x 3" angle rolled leg in to replace existing as needed in aeration 1 zone.
□ Furnish and install approx. 100' of 18" x ¼" steel plate to replace top of outer wall in aeration zone 1.
□ Furnish and install 304SS unistruct to support water lines, chlorine lines conduit etc. as required.

Furnish and install approx. 40' of 10" channel to replace channel on top of bulkhead as needed.
Furnish and install bent plate 8" x 3" to replace peripheral toe plates as required.
Furnish and install 2 plates to repair bulkhead wall where contact trough is removed.
Furnish and install 2 light support brackets. Locate same location as existing lights.
Furnish and install 34' long section of walkway to replace section from Plant 2 to Plant 1.
Furnish and install aluminum handrails and toe plates for bridge walkway across clarifier and part of walkway to outer wall.
Furnish and install new aluminum grating for bridge walkway across clarifier and part of walkway to outer wall.
Furnish and install 3" x 2" x ¼" angle to support aluminum grating as required.
Furnish and install 3 new support brackets for aluminum influent trough.
Furnish and install additional support channels and kicker on bulkhead between aeration 3 and digester consisting of two 15" channels x 30' long and 20' of 12" I-beam to be used as a kicker. Plate and anchors to be included.
Furnish and install new aluminum handrails on existing stairway.
Furnish and install new aluminum grating and required support steel for 36" x 36" stairway landing.
Furnish and install miscellaneous aluminum to replace plate where influent box ties into influent trough.
Remove approx.100' of trough that was use in the contact stabilization mode.
Furnish and install all new 2" sch 80 pvc wash down piping, fittings and hose bibs. Support with 304SS unistrut.
Furnish and install all new 1" chlorine line.
Remove any items on plant that are not being used, like old support brackets, piping etc.
Remove 54"X54" opening rails and grating on walkway between plant and close walkway opening with new handrails.
Install 2 new LED double headed light assemblies. Same as ones on existing new EQ tank
Sweep blast and paint interior with 16 mils coal tar epoxy.
Sweep blast and paint all items above walkway and exterior of plant with 5 mils epoxy, color to match existing. Exterior will not be painted below grade
GUARANTEE:
One (1) year from date of acceptance not to exceed eighteen (18) month from date of shipment

Total Cost for WWTP #1, #2 & #3= $1,704,000.00
Bid Date 4/8/16

Note:

1. Guarantee on all workmenship and materials.

2. Price includes proper supervision, materials and labor.

3. Price is good for 30 days and subject to repricing after 30 days.

Upon approval, please sign below and fax this document to our office at (352) 793-9074. Thank you!

Signature:	**Date:**

ADJUSTMENTS TO WWTP REHABILITATION PROJECT

Pro Forma Amount	$	1,104,764.00	
Total Equova Bid	$	975,000.00	
Sole Source Adj.	$	114,075.00	11.70%
Net Pro Forma Amount	$	990,689.00	
Less Adj for allowed invoices	$	7,205.75	See subschedule below
Total WWTP Rehab Alowed	**$**	**983,483.25**	

Engineering Services subschedule Source: Exhibit CAJ-7

Date	Summary of Description	Amount	Allowed	Difference
6-Dec-16	Force Main Expansic	$ 332.50	$ -	$ 332.50
6-Dec-16	WWTP Rehab	285.00	285.00	$ -
7-Jul-17	WWTP Routine Oper	991.25	230.00	$ 761.25
7-Jul-17	Force Main Expansic	190.00	-	$ 190.00
7-Jul-17	Reclaimed Water Ex	5,922.00	-	$ 5,922.00
2-Nov-17	Plant Rehab	172.50	172.50	$ -
NA	CEI Services	121,870.00	121,870.00	$ -
	Total	$ 129,763.25	$ 122,557.50	$ 7,205.75

Asset Management Resources for Small Drinking Water Systems

Asset management is the practice of managing infrastructure capital assets to minimize the total cost of owning and operating them, while delivering the service level customers desire. This management framework has been widely adopted by the water sector as a means to pursue and achieve sustainable infrastructure.

The documents and tools below explain the benefits of asset management and ways to implement specific asset management practices for small systems.

- The Check Up Program for Small Systems (CUPSS)
  CUPSS provides all the tools required for drinking water and wastewater utilities to implement an asset management program and develop effective asset management plans.
- Successfully Protecting Your Investment in Drinking Water Infrastructure: Best Practices from Communities and Local Experts
  This document provides examples of common challenges faced by water systems and the asset management solutions that increase cost efficiency, improve system reliability, and fortify communications.
- Reference Guide for Asset Management Tools
  This guide provides a framework to assist systems in all aspects of developing and implementing an asset management plan.
- Asset Management: A Best Practices Guide (EPA 816-F-08-014)
  Asset management is maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost.
- Asset Management for Local Officials (EPA 816-F-08-015)
  This fact sheet is intended for local officials who are directly or indirectly involved in decisions affecting water systems.
- Building an Asset Management Team (EPA 816-F-08-016)
  This fact sheet is intended for local officials, owners and operators of water systems, technical assistance providers, and state personnel.
- Taking Stock of Your Water System: A Simple Asset Inventory for Very Small Drinking Water Systems (EPA 816-K-03-002)
  This brochure is a guide to help very small water systems, such as manufactured home communities and homeowners associations, assess their condition by preparing a simple asset inventory.
- Asset Management: A Handbook for Small Public Water Systems – STEP Guide Series (EPA 816-R-03-016)
  This guide is designed for owners and operators of small community water systems (CWSs). CWSs include all systems (both publicly and privately owned) with at least 25 year-round residential customers or 15 year-round service connections.

- State Asset Management Initiatives (PDF)
  This document summarizes the initiatives states are taking in regard to asset management.

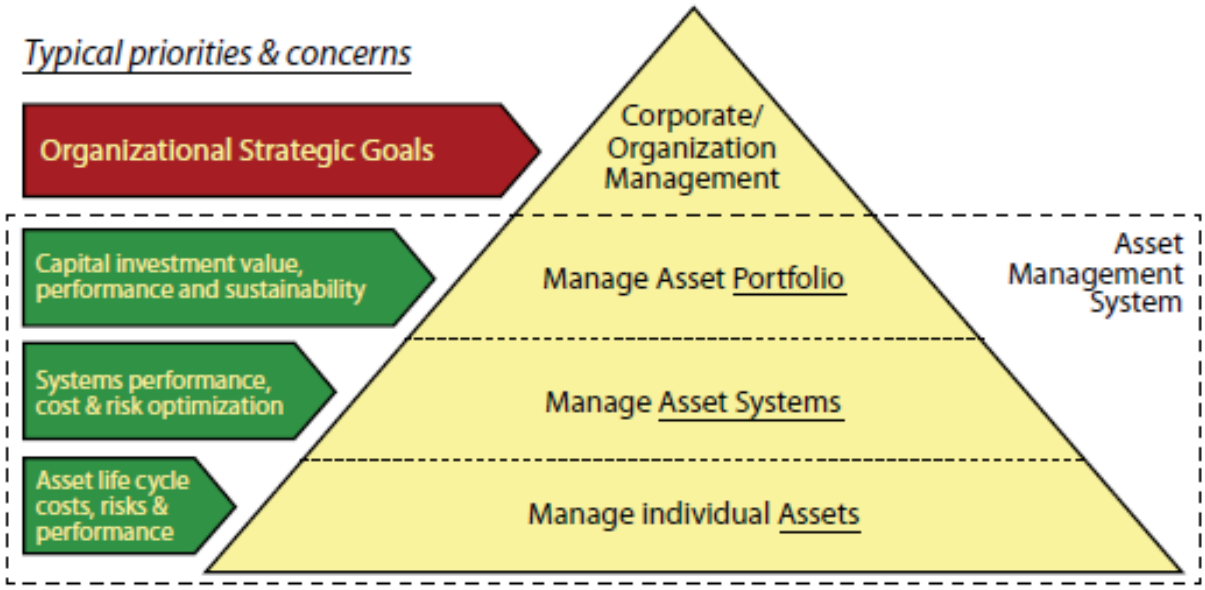
LAST UPDATED ON FEBRUARY 8, 2018

ASSET MANAGEMENT STRATEGY OVERVIEW

In 2012 Corix established the Engineering and Asset Management Strategy based on the Institute of Asset Management's Asset Hierarchy.

The 2012 report identified the first level of the hierarchy, Figure 1, "Manage Individual Assets" as representing our "Current State" of asset management within Corix. This was an outcome of factors that included customer agreements, regulatory requirements, age, and type of asset. Although a robust approach for managing relatively non-complex systems and a small asset base, as complexity increased due to size, regulatory and customer requirements, and age for example, the hierarchy illustrated how our asset management strategy needed to evolve to address these requirements.

Figure 1: Hierarchy of Assets within an Integrated Management System



The identification of the hierarchy was a key initial step in advancing our thinking, allowing us the "lens" to address complexity within our systems. The December 2012 Report recommended that Corix target the top of the hierarchy, "Corporate/Organization Management". This option is best aligned to our strategic plan, since it manages and mitigates risk, and improves operational efficiency. It also supports growth through acquisitions and new projects by fully utilizing the knowledge and experience gained through the application of asset management to our systems.

In early 2013, Corix adopted the AM framework shown in Figure 2 below. The AM framework is based on the EPA's 10 step asset management process. It has been adapted with the placement of the Level of Service in the first box, thereby shifting the first four boxes on the top to the right. This focuses the process on the level of service and allows for the process to be a closed loop whereby the asset management plan is directly linked into the delivery of the level of service. As the assets and operations become more complex, the application of an AM framework provides the backbone to the processes, tools, and methods to support the thinking. It is a robust methodology that has proven to be applicable across the wide range of utilities Corix has while being able to meet future asset management requirements.

The EPA's approach to asset management is based on the following five key questions:

1. What is the required level of service;
2. What is the current state of the assets;
3. Which assets are critical to performance;
4. What are the best approaches to operation and maintenance and capital requirements; and,
5. What level of investment is required to keep the system sustainable.

These five questions map directly to the ten boxes of the AM framework map to the five key questions as shown in Table 1 below.

Table 1: Mapping the EPA Five Key Questions to the AM Framework

EPA'S FIVE KEY QUESTIONS	AM FRAMEWORK BOX
1. What is the required level of service?	Box 1 – Level of service
2. What is the current state of the assets?	Box 2 – Asset Registry Box 3 – Asset Performance and Failure Box 4 – Residual Life Box 5 – Life Cycle Replacement Costs
3. Which assets are critical to performance?	Box 6 – Business Risk "Criticality"
4. What are the best approaches to operation and maintenance and capital requirements?	Box 7 – O&M Costs and Optimization Box 8 – Capital Investment Requirements
5. What level of investment is required to keep the system sustainable?	Box 9 – Investment Strategy Rate Case Justification Box 10 – Total Asset Management Plan

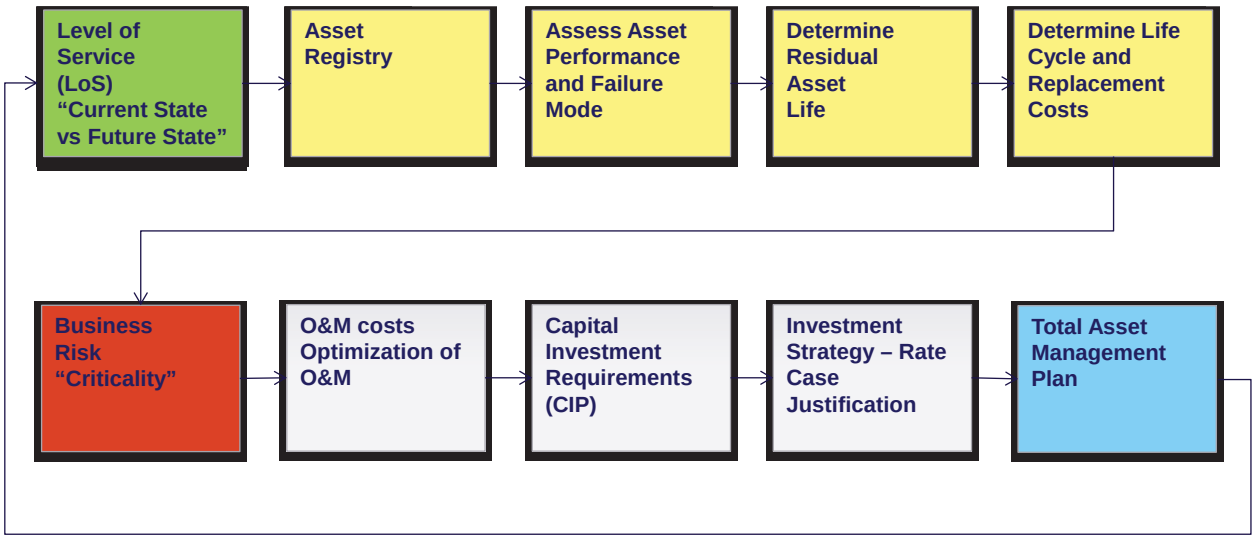
The first box, Level of Service, defines our service requirements to our customers and sets out the requirements by which the system has to perform. Changes driven by the performance of the assets, regulatory requirements, and/or customer desires, can be identified and used to assess the required changes from the current service level to meet the future service requirements and the resultant implications. This addresses the first of the five key questions.

The next four boxes in the framework address the second key question; what is the current state of the assets by understanding what assets are in the system, where they are, their condition, remaining useful life and residual life. These establish the type, condition, and ability of the assets to deliver the level of service relative to the current and future requirements. It is also the interface with daily operations where activities like tracking the assets, preventive maintenance, maintenance history, and system performance are undertaken. These first five boxes define the operational side of asset management aligned with the overall delivery of the level of service. The bottom five boxes drive the strategic decisions based on the performance of the first five boxes.

Boxes six through ten are strategic in their application. The sixth box, “Business Risk”, assesses the risks associated with the performance of the assets to meet the desired level of service, and sets out mitigation and management approaches that consider the consequence and probability of the risk. The seventh and eighth boxes set out the operational and capital budgeting approach based on the current level of service and address the fourth key question.

The tenth and final box in the AM framework is the asset management plan and addresses question five. The asset management plan (AMP) ties the boxes together along with the regulatory strategy for recovery which is the ninth box. While the level of service can be clearly defined, the ability to deliver this is balanced by the assets, their condition and performance, the strategies used for operation and maintenance and capital requirements. Depending on the complexity of the systems, relative to the level of service and performance of the assets, this can require a range of scenarios to determine the appropriate strategy for the assets for that situation. This requires the input and support of all areas of the business including Operations, Engineering, Finance and Regulatory.

Figure 2: Asset Management Framework (AM Framework)



Each of the boxes has associated business processes, tools, metrics and outcomes specific to that box of the framework. The AM framework provides a clear illustration on the inter-relationships between each step and the dynamic nature associated with balancing the sustainability of the system.

The key to this is fully understanding the level of service requirements. This sets the constant by which any changes in the other boxes have to be balanced. Clearly defining the level of service relative to the assets, their performance, the associated mitigation and management of the risks, provides strategies for operation and capital requirements and culminates into the overall investment strategy and the asset management plan to support a sustainable utility.

PROJECT BRIEF

OPERATIONS MANAGEMENT SYSTEM

Utilities, Inc.

April 2, 2017

CONTENTS

1 OVERVIEW

1.1 Background

1.1.1 Current State

With the adoption of the asset management framework within UI, the implementation of the asset management plans, and the requirement for supporting documentation, the business units have expressed the need for a set of improved tools. Most business units rely on aging paper maps for critical asset information such as location, size, material, age of water and sewer mains, location of valves, etc. In some locations paper maps do not exist and thus require operations staff to rely on senior employees to augment the detailed knowledge of the system's assets. The lack of accurate and readily available field information reduces the efficiency of field staff. The lack of electronic records inhibits the utility's ability to leverage asset age, condition, maintenance history, and criticality in developing optimized O&M and Capital plans. Multiple modes of record keeping (log books, proliferation of different spreadsheets and forms) and the lack of effective tools mean that opportunities for operational efficiency improvements and system-level analysis to support enhanced asset management are lost. Examples include information on the location, nature, and cause of line breaks, data captured in incident reports, field activities, and log books with inconstant (or lack of) data fields and descriptors. This results in extra paper work and does not enable failure data to be fully leveraged to establish an asset's condition this is integral to identifying and prioritizing line maintenance, refurbishment, or replacement. Similarly, management of routine but extensive maintenance activities such as valve exercising and hydrant flushing becomes cumbersome and prone to omissions when managed through ad hoc tools. Furthermore, line-of-sight to condition and maintenance status of critical assets such as hydro tanks is not available to support risk management at a company or business unit level.

1.1.2 Future State

With the appropriate tools in hand UI would be able to develop a longer-range view on asset renewal requirements, effectively and efficiently track and manage maintenance activities, and make better data-supported and risk-informed decisions. Tools will need to have interfaces that are easy to use for various user groups (field staff, management, engineering or business analysts, and executives), intuitive in nature, and able to facilitate and understanding at the system level as well as the business unit level. The toolset should streamline common tasks while capturing key information in a form that is applicable to the various business processes in which it is used. Additionally, the toolset should support data extraction and analysis to help identify and unlock value within the business.

By way of an example, the toolset would ensure that field staff responding to a line break have up-to-date information on the location, age, material, maintenance history, and latest condition assessment for the line segment as well as access to as-built drawings, easement information, and possibly other utility locations. Information on the repair could readily be captured with standardized fields for commonly needed information (nature of failure, suspected cause, repair type, customer notification, re-surfacing requirement, etc.). Any relevant photographs could also be captured. This information

could subsequently be leveraged for customer service follow-up, level of service tracking, maintenance planning, and capital project identification, justification, and prioritization with data documentation which can then support capital recovery in subsequent rate cases and dockets.

1.2 Solution Overview

A cross-regional and cross-functional team has been working on the development of an overall solution since the fall of 2015. In early 2016 Black and Veatch (B&V) was engaged to support the solution identification and implementation. These activities are summarized in previous project memos. As a result of these activities, Esri has been selected as the GIS platform and Lucity as the Computerized Maintenance Management System (CMMS) provider. A high-level perspective of the overall solution is provided in Figure 1.

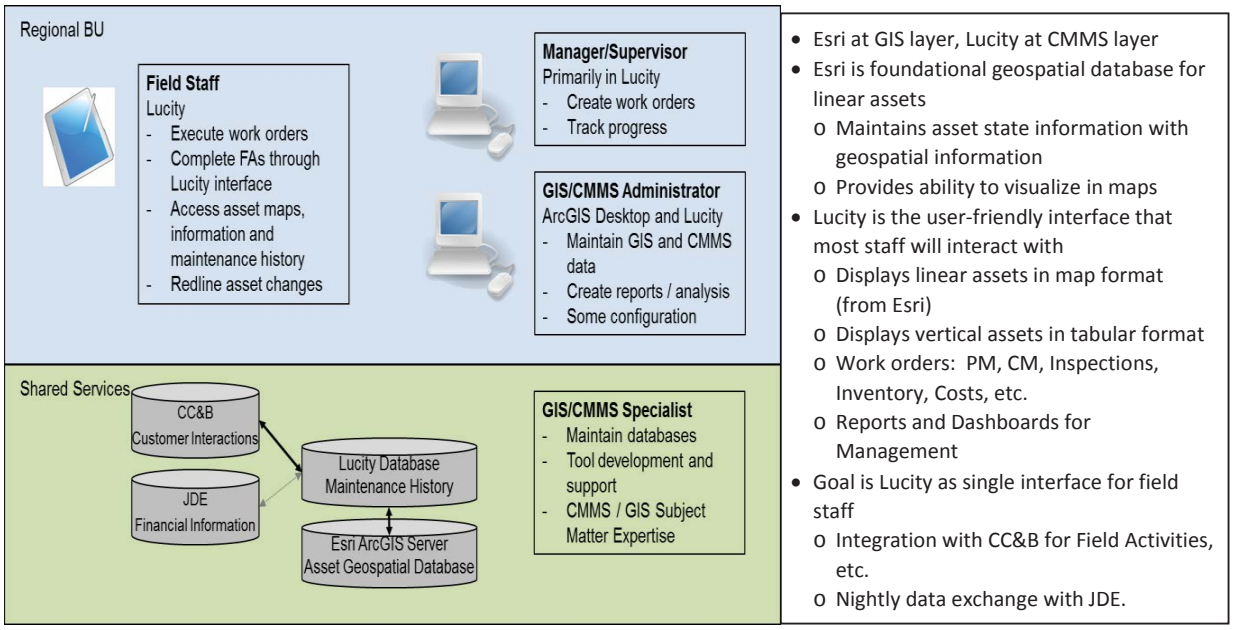


Figure 1. OMS Solution Overview

The main elements of hardware and software required to support this solution are as follows:

- ArcGIS Server licenses, housed in UI's existing data center. It has been determined that sufficient hardware capacity already exists to support this.
- ArcGIS Desktop Standard licenses, installed on a desktop computer, one for each of the seven business units as well as for Shared Services.
- Lucity OMS licenses with Work Management, GIS Desktop, GIS Web, Asset Management, Mobile, and API modules included. These modules are distributed amongst the data center, regional offices, and on mobile devices.
- Tablets for field mobility, either iOS or Android (TBD), assigned to each field staff person.

2 PROJECT INFORMATION

2.1 Objective

The objective of this project is to develop and implement an effective set of GIS-centric tools to support field efficiency, asset management, and customer engagement. These tools will improve operational efficiency by making relevant asset data available in the field, efficiently capture information pertaining to the work activity completed and the condition of the asset. They will also provide a record of the activity which is directly tied to the asset and which is available in a geospatial representation. The toolset will also enable the generation of maps and other information to improve customer engagement and communication.

2.2 Scope

This project encompasses the development and implementation of a corporate Geographic Information System (GIS) and Computer Maintenance Management System (CMMS), collectively known as the Operations Management System (OMS) within Utilities, Inc. It is to include acquisition, configuration, and deployment of the necessary hardware and software for a common infrastructure within Shared Services, as well the configuration and deployment of the necessary technology elements to be housed within the regional business units. As a result of efforts that have already been undertaken, Esri has been selected as the GIS platform and Lucity as the CMMS.

Major scope items included in this project are:

- Finalization of contract negotiations with Esri and Lucity.
- Initial implementation of the solution set including establishing the initial architecture to support OMS services, configuration of tools to meet an identified initial set of operational requirements, initial integration with other information systems (e.g. CC&B), and pilot testing within a target utility.
- Development of standardized business processes for the use and maintenance of OMS data.
- Procure and implement OMS software and hardware for use within Shared Services as well as individual business units to support full-scale deployment across UI and Corix Texas.
- Data conversion, training, and deployment across business units.

The following items are excluded from this project scope and will be the responsibility of individual business units:

- GIS mapping of infrastructure assets (linear assets).
- Establishment of asset registries (vertical assets) for conversion/upload to the CMMS.

2.3 Plan Overview

The following are the major elements of the project plan.

2.3.1 License Agreement Finalization

This involves finalization of licensing agreements with Lucity and Esri. Quotes for licenses to support an agreed-upon architecture have been received and are included in the project budget proposed below.

While pricing has been obtained for the full scope of deployment, only the initial licenses required to support the pilot implementation will be purchased at this time.

2.3.2 Initial Implementation (Pilot)

The first implementation, or pilot, for the toolset is to be an implementation of the full initial set of functionality within a single utility system. The Lake Groves system in Florida is proposed for the pilot. As this system has been recently GIS mapped using the newly-developed data standard for UI GIS mapping, and also has a reasonably comprehensive asset registry populated with vertical assets, it will have good asset data set to work with. Additionally, the ease of access by the core project team to Lake Groves, it being located in the Orlando area, and the support afforded by the local Florida business unit makes it well suited for the pilot.

The major work activities to be included in the pilot implementation are described below.

Development of IT Environment: This involves implementing the necessary hardware, software, and connectivity, and establishing the GIS and CMMS databases within the Shared Services IT environment, facilities within the Regional/Local office, and mobile capabilities.

> **Important Note:** Once the Esri server environment has been established within Shared Services, this server will be available to house Esri GIS data as it is developed for other regions. Specifically, the Regional Business Units can proceed with GIS mapping and establish GIS capability in advance of the general roll-out of the OMS solution

Detailed Functional Scope Delineation: While the functionality of the initial release of the OMS has been broadly defined through the CMMS requirements evaluation process, this activity is to specifically enumerate the particular workflows, queries, and other activities which must be mapped out in detail and implemented in the OMS. Importantly, this will also specifically exclude those workflows that will not be supported in the initial release due to their low value or high complexity.

Detailed Requirements Development: This involves developing a detailed understanding of the various workflows staff will be executing with the OMS as well as the various business processes which supply and utilize the information pertinent to these workflows. This detailed understanding will enable the tools to be set up in an efficient information format that interfaces with other data sources to be designed. It is anticipated that through this activity opportunities to streamline and optimize processes will be capitalized upon. Requirements will be documented to enable configuration of the Lucity and the interfaces it will have with other tools and process as well as to identify asset information which must be collected and loaded into the tool. This will be accomplished in a series of two to four workshops.

OMS Design and Configuration: This includes the development of the capacity within the tools to support the various work flows and business processes identified above. In this process, the Lucity software will be configured to access, present, and store the information associated with the various work activities in a format convenient for the users. Those users include field staff in a mobile or in-office scenario, as well as supervisory and management staff.

System Integration (OMS to CC&B and JDE): This is the development of the bi-directional (real-time or near-real-time) connection between Lucity and CC&B, as well as the (non-real-time) connection between Lucity and JDE. Integration between Lucity and CC&B will enable Field Activity (FA) data to move directly between field staff and Customer Service. This will enable field staff to use Lucity as their primary interface for most activities in place of CC&B and thus reduce the need to enter information separately into these two systems. It is also expected that a degree of data interchange, although not likely real-time, will be developed with JDE so that information such as asset value from Purchase Orders can be shared between the two systems.

Testing and Refining: In this stage, the functionality is verified and refined in a test database environment both remotely by our consultants and in the field by UI field staff. Environments to be tested include in-office, online mobile, offline mobile, and the integration with CC&B and JDE platforms.

Data Gathering and Conversion: Asset and maintenance information necessary to support use of the OMS will be assembled and loaded into the configured OMS. In addition to existing asset registry information, it is anticipated that information on lower-level assets than currently captured, as well as some additional information not currently in the register will be needed. Having this information in the OMS prior to launch will facilitate improved uptake by field users.

Training: Staff will receive role-specific training on the use of the OMS. This will be conducted on-site as well as with remote follow-on support. As part of this activity, staff will need to be trained in applicable processes required to maintain data integrity over time reflecting the dynamic character of asset data. Training will be accompanied by appropriate documentation.

Roll-Out and Support (Pilot Utility): This is "Go Live" within the pilot utility. Staff will use the OMS in a production database environment for day-to-day activities. During this time period, the project team will work closely with the field staff in the pilot system to evaluate OMS performance and make improvements. Once the OMS has met performance expectations, and after sufficient experience has been gained in the pilot utility (approximately 3 months), UI can begin the general roll-out of the toolset across all business units.

2.3.3 General Deployment

After successful completion of the pilot/initial implementation, general deployment of the OMS will begin. It is anticipate that this roll-out will be undertaken on a region by region basis and consist of the following general steps:

- Establishment of environment: Acquisition and configuration of local licenses, servers, mobile devices, etc.
- Identification and implementation of any critical region-specific OMS functionality.
- Data conversion: If not already done, this will involve uploading of the region's GIS data. It will also involve importing the existing asset registry to Lucity, cleaning up of information, and obtaining missing information as necessary.
- Training: Users will be trained on use of the OMS for their particular roles.
- Go-Live: Start of use of the OMS

- Post-Go-Live support: Support will be provided to assist new users as they become familiar with the new system.

The timeline to accomplish the general deployment will be informed by the pilot implementation, but it is expected to be on the order of two months per region.

2.4 Organization

The organization of the project team is as follows:
Project Leadership: Jim Devine (Project Owner), David Kitching (Asset Management Prime).
IT: Tom Ostler
Project Manager: New Position
OMS Subject Matter Expert: New Position
Pilot Operations Prime: Nate Carver
Project Team: Martin Scanlon, Jill Strickler, James Eason, Patrick Flynn, Ron Medders, Stephani Jackson (and others above)

The project execution will also be supported by a number of consultants which include Black and Veatch, Lucity, Intoolect, and ManageForce.

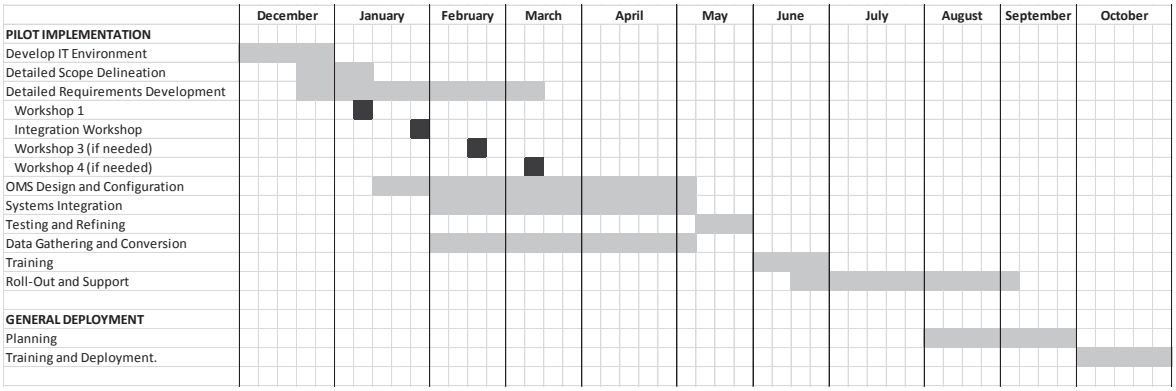
Prime and supporting roles for the tasked as outlined above are described in Table 1:
Table 1 Project Responsibilities

Activity	Prime	Support
Develop IT Environment	UI IT	Lucity, Esri, B&V
Detailed Scope Delineation	B&V	Lucity, Core Team
Detailed Requirements Development	B&V	Core Team with FL Ops, Lucity
OMS Design and Configuration	Lucity	IT, B&V
Systems Integration	Intoolect (CC&B), ManageForce (JDE)	UI IT, Lucity, B&V
Testing and Refining	B&V	Lucity, FL Ops, Intoolect
Data Gathering and Conversion	FL Ops	FL Ops, B&V, Lucity,
Training	Lucity	Possibly B&V as co-trainers
Roll-Out and Support	UI PM	Lucity, B&V, Intoolect, FL Ops

2.5 Project Timeline

Figure 2 below, shows the timeline for the pilot implementation and the beginning of general deployment across the remaining business units.

Figure 2 Project Timeline



2.6 Project Budget and Overall Solution Cost

As outlined in Table 2, the initial implementation, referred to as the pilot, is estimated to cost $1,008,000. An addition $3,746,000 is anticipated to be spend on the full deployment of the OMS across UI and Corix Texas. This includes $1.5m for GIS mapping of linear assets. When combined with the approximately $90k spent to date, the project total is $4,844,000. The annual O&M impact is estimated to be $822,000 per year.

Table 2 Project Cost Estimate ($000)

Item	To Date	Pilot	Roll-Out	Capital	O&M
GIS Mapping (@$5/ERC)	**-**	**-**	***1,500***	***1,500***	**-**
GIS & CMMS Software Licenses	-	151	320	471	66
Hardware (tablets, mappers, computers)	-	8	317	326	231
Implementation - Consultants	70	360	1,040	1,470	15
Implementation - Cap Time	10	393	208	611	-
Implementation - Expenses	10	95	362	467	-
Incremental Staffing - BUs	-	-	-	-	455
Incremental Staffing - SS	-	-	-	-	70
OMS Total	***90***	***1,008***	***2,246***	***3,344***	***822***
TOTAL (GIS Mapping & OMS)	**90**	**1,008**	**3,746**	**4,844**	**822**

The annual revenue requirement for the above expenditures is estimated to be $1,957,000.

3 PROJECT JUSTIFICATION

GIS and CMMS are extensively used within water and wastewater utilities and have been found to be extremely valuable tools to improve operational efficiency, service delivery, capital planning, and risk management. UI anticipates all of these benefits to flow from the OMS. Additionally the Lucity CMMS has the functionality needed to meet the requirements of the Health, Safety, and Environment Incident Management System and will result in cost avoidance accomplished by not acquiring and maintaining a separate software package to meet those critical needs.

Benefits of the OMS include:

- Replacement of outdated and degraded paper maps with a GIS database, which affords better access and maintenance of critical infrastructure information both in the field and in the office.
- GIS mapping of the infrastructure and CMMS records of maintenance and asset condition will help mitigate the challenges and risk of staff turnover and retirements within an aging workforce.
- The OMS will support improved utilization of the extensive investment made each year in CCTV inspection of sewer lines enabling it to be captured in a geospatial database, rather than paper reports and DVDs, and accessible for advanced analysis.
- Workforce efficiency will be improved through better access to asset and maintenance information and reduced double-entry of data such as into log books, FA responses, monthly reports, capital project documentation, and rate case filings.
- The OMS will improve line-of-sight visibility for management of the status of required maintenance activities, asset condition, and service levels. This will enhance management's ability to appropriate balance risk and service delivery in a cost-effective manner.
- The use of the OMS will lower costs by supporting optimization of asset life-cycles through improved ability to identify, execute, and manage maintenance activities in a timely manner. This will also help reduce the risk of service-affecting asset failures.
- Asset condition and maintenance history information made available through the use of these tools will support better identification, prioritization, and justification of capital projects leading to more efficient use of capital for service improvement and risk reduction. Use of these data in systematically evaluating it is particularly important for the maintenance and renewal of water and sewer mains, which represent the largest portion of infrastructure asset value, yet are difficult and costly to inspect.
- The combination of GIS and CMMS will provide a foundational platform for further and continuous service delivery and asset stewardship improvements in the future. Examples of enhancement that this technology enables are: the integration of GIS and smart meters to drive reductions in non-revenue water; timely communication with customers and stakeholders regarding service outages, enhanced water conservation efforts, and optimized route scheduling to reduce staff hours and vehicle mileage in response to service calls.

While it is difficult to quantify directly the benefits of using the OMS, Corix's experience at the University Oklahoma (OU) provides a useful reference point. Corix's utility operation at OU has made effective use of its CMMS and associated Asset Management processes for the past several years. This utility has

experience year-over-year O&M costs saving in the range of 5-10% and seen service levels improve as supported by both tracked data and positive customer feedback.

4 SUMMARY

The implementation of an Operations Management System within Utilities, Inc., as outlined within this Project Brief, will improve operational efficiency and provide a valuable tool set for management of infrastructure assets. The combination of GIS and CMMS will enable staff to have ready access to asset information and maintenance history whether in the field or in the office, will streamline information flows, and will provide data on which to base capital planning and operational management decisions. This toolset, which is commonplace in medium and large utilities, will enhance UI's ability to bring advanced operational and managerial tools and processes to the small utility sector.

FINAL

CMMS REQUIREMENTS ANALYSIS & RECOMMENDATIONS

Technical Memorandum

B&V PROJECT NO. 191783

PREPARED FOR

Utilities, Inc.

11 JULY 2016

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

Background

Utilities, Inc. (UI) is in the process of developing an asset management program in order to more efficiently and effectively manage the water and wastewater infrastructure assets within the 550 utility systems it currently operates. In developing an overall strategy for asset management, Utilities, Inc. has identified the need for additional information systems in order to support the overall program. These systems include an enterprise Geographic Information System (GIS) and Computerized Maintenance Management System (CMMS). Further, to achieve the objectives and full benefits of its asset management program, the GIS and CMMS will be required to be tightly integrated and share data with each other as well as other key corporate information systems.

Utilities, Inc. has selected Black & Veatch to assist with the evaluation of functional and technical requirements for, the selection, and implementation of its corporate-wide CMMS solution.

Over the course of a week during March 2016, a Black & Veatch CMMS implementation expert met with UI and Corix personnel representing multiple regions and areas of varying size and complexity. The collective project team reviewed the goals and statuses of both the GIS and asset management strategic initiatives and capital projects currently underway within UI. In addition, the project team reviewed different CMMS solution capabilities, key work processes for both back office and field personnel, functional and technical requirements of an optimum CMMS solution, and conducted field visits to representative plant and distribution/collection system maintenance facilities to review the work environment and requirements for field personnel.

The following sections provide a high level overview of the aforementioned activities to provide context to the identified functional and technical requirements and candidate vendor CMMS solutions presented within this document.

STRATEGIC INITIATIVES / CAPITAL PROJECTS

As previously discussed, UI is currently in the process of executing two separate, but related, strategic initiatives that are relevant to the identification, selection, and implementation of a CMMS solution – asset management and GIS. A brief summary of each of these initiatives is provided below.

Asset Management

UI is currently in the process of developing its asset management program. Using the EPA/WERF SIMPLE model, UI has developed and delivered basic training on asset management to staff, developed a template asset register for population by each region, defined key levels of service, and identified the need for risk and capital prioritization methodologies.

An effective asset management program will allow UI to make the right investments at the right times for cost effective delivery of service.

The implementation of a CMMS solution will seek to support the asset management program by providing ready access to the information and analytics related to the maintenance of UI's infrastructure assets. Information such as an accurate registry of assets, maintenance history and costs associated with each asset, condition, and remaining effective useful life will allow UI staff to make more informed rehabilitation versus replacement decisions.

Overall, the key objectives of UI's asset management program and implementation of a CMMS solution are as follows:

- Provide a streamlined toolset for area managers, operators, and maintenance staff to record maintenance and inspection information on assets in a format that is more accessible for risk determination/mitigation, capital planning, and budgeting decisions.
- Develop a better understanding of where maintenance budgets are being spent and determine whether resources are being targeted for the greatest positive impacts.
- With a significant amount of the workforce nearing retirement, capturing the institutional knowledge of where infrastructure is located as well as its condition.
- Develop the data and tools necessary to objectively identify and mitigate risk – connect operations, engineering, regulatory, and finance to more efficiently identify, budget for, and execute capital projects and infrastructure replacements.

A consistent factor communicated by the project team during discussions and observed during field visits was the need for a more efficient solution for maintenance personnel. UI benefits from a tremendous amount of professionalism from field staff with excellent understanding of and concern about quality and levels of service. However, current inefficiencies in their tools and processes are a consistent challenge for field staff to complete and adequately record the information associated with maintaining their respective utility systems – particularly to a level of detail necessary to support UI's vision for its asset management program.

Geographic Information System (GIS)

In parallel with its asset management program, UI is also in the process of developing a GIS program to store and maintain information on its distributed infrastructure assets. Due to the dispersed geographic nature of assets in the collection and distribution systems, a GIS is an effective tool for not only managing the location and physical descriptive properties (e.g. material, diameter, length, etc.) of water and wastewater infrastructure assets, but is also a powerful tool that can be utilized to analyze spatial coincidence of activities and events associated with the infrastructure assets.

With "pockets" of GIS already in use in some of its utility systems, UI has elected to build on those efforts and standardize on the Esri platform for its GIS program. UI has identified GIS as the eventual source repository for the linear assets that are part of the collection and distribution systems. Examples of these assets include:

- Water Distribution
  - Water mains
  - System valves
  - Control valves
  - Fire hydrants
- Wastewater Collection
  - Gravity mains
  - Force mains
  - Manholes
  - System valves

For tools and vertical assets such as those within a lift station or plant, GIS will not be the source repository for these assets. Examples include blowers, pumps, motors, electrical switchgear and panels, chemical analyzers and feed pumps, process structures (clarifiers, basins), hoists, etc.

Although a centrally hosted enterprise GIS database is envisioned once adoption of GIS technology and data development has occurred in all six regions, initially the GIS databases will be developed

and hosted on a more regional level utilizing a common geodatabase design (structure) that will be augmented to account for regional regulatory and business requirements – Esri's local government information model. All data maintenance and "ownership" of the data is intended to occur at a region or sub-region level depending on data complexity, staff capabilities, and volume.

KEY MAINTENANCE WORK PROCESSES & OPERATING ENVIRONMENTS

UI currently operates approximately 550 utility systems in six regions throughout fifteen states. Each region has a President and Vice President of operations that are responsible for the operation of the utility systems within that region. Depending on its size, a region might be subdivided into smaller sub-regions with regional managers responsible for multiple areas within that region. Most regions correspond to one, possibly two states depending on number of systems.

Within a region, an area manager is responsible for multiple facilities or systems. The area manager represents the front line supervisor and is a key user of and consumer of the information within the ultimate CMMS solution. Generally, maintenance staff report up through an area manager. For systems that include larger plant facilities, there is also the lead operator role which is responsible for the operation of a plant or plants, including monthly operating reports.

The following sections provide additional detail on the asset and maintenance management processes and operating environments within both the plant facilities and in the distribution and collection systems. However, regardless of plant facility or distribution/collection system, key information that is to be recorded relevant to the use of a CMMS solution includes the following:

- Asset Information
  - Identifier
  - Nameplate information (make, model, manufacturer, serial number, etc.)
  - Performance or capacity information (GPM, SCFM, horsepower, etc.)
  - Condition information
  - Install date
  - Acquisition cost
  - Warranty expiration date
  - Effective useful life
  - Risk prioritization scoring (likelihood of failure, consequence of failure)
- Maintenance Information
  - Asset being worked on
  - Date(s) of maintenance activity
  - Employee performing maintenance
  - Tasks completed / activities performed
  - Parts (and costs) to complete maintenance
  - Notes/Comments
- Inspection Information
  - Facility being inspected
  - Date of inspection
  - Employee conducting inspection
  - Yes/No inspection points (e.g. visually inspected high service pump)
  - Quantitative inspection points (e.g. current pH level)
  - Notes/Comments

Although most commercial CMMS solutions are capable, the following is information that is specifically not captured by UI operations and maintenance staff and will not need to be recorded in the eventual CMMS solution as part of operations and maintenance activities at this time.

- Employee labor hours and costs (hourly rate, regular time or overtime) associated with each maintenance activity or work order
- Parts warehousing and inventory management (part numbers, min/max thresholds, average unit pricing, parts turnover analysis, etc.)
- SCADA interface to drive preventive and corrective maintenance by runtimes or metrics

Plant Facilities

The majority of UI plant facilities are not extremely large treatment or production plants in a traditional municipal utility sense. The largest plant is a 2 million gallons per day (MGD) plant with several smaller, or packaged, plants being more the norm throughout the different utility systems.

Typical non-emergency operations and maintenance activities performed by plant personnel include daily plant checks, recording of various chemical and pH readings for the monthly operating reports, elapsed time readings on equipment, and conducting preventive maintenance activities such as oil changes and lubrication. Figure 1 shows an example of one method the Wekiva plant (Florida) currently utilizes effectively to track equipment in/out of service information, dates of last preventive maintenance (PM) activity, and PM activities currently due for equipment.

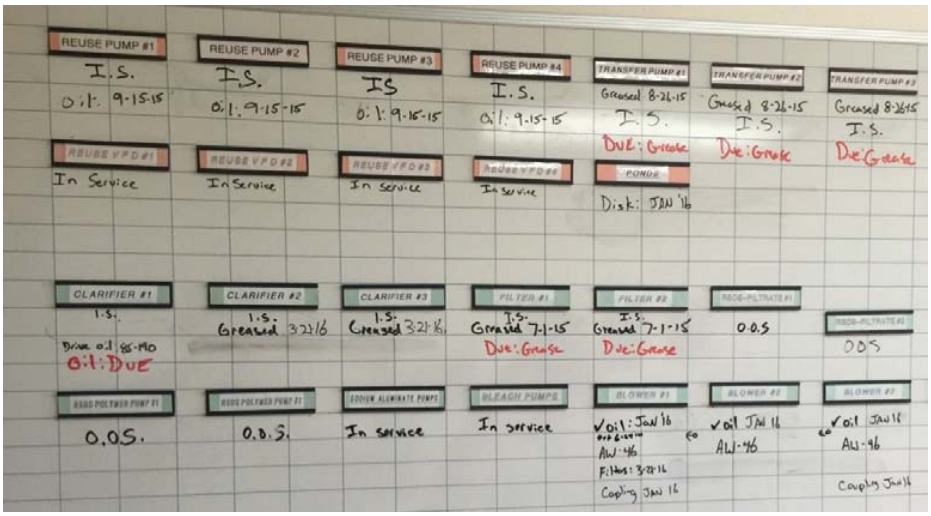


Figure 1. Example PM Scheduling at Wakiva Plant

An additional means of recording maintenance activities within the plants is the use of maintenance log books. Larger plants and those also dictated by regulatory requirements have staff permanently assigned and located to the facility. However, some smaller plant facilities do not have permanently assigned personnel. Operations and maintenance staff visit the facility on daily basis to check and inspect equipment, take readings for the monthly operating reports, and address any outstanding maintenance issues. In these instances, readings and maintenance activities are recorded in a daily log book kept on site as shown in Figure 2.

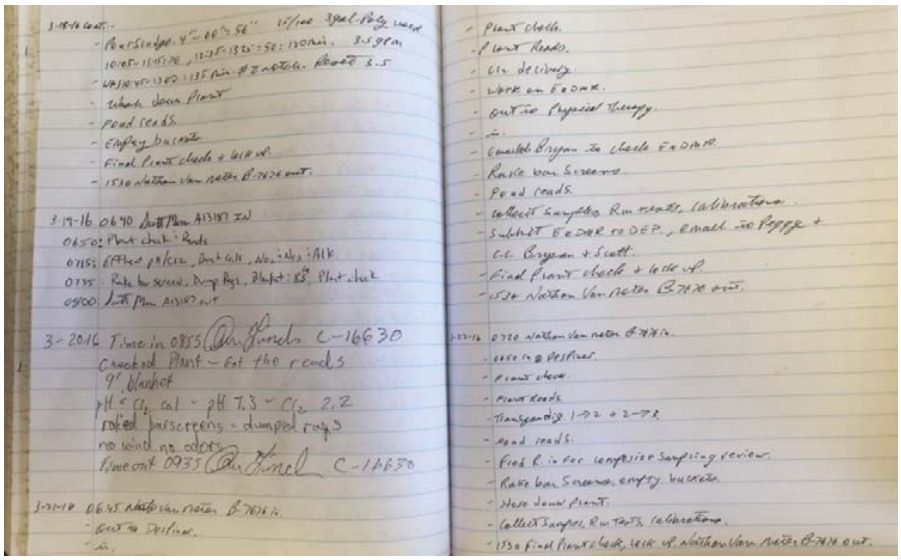


Figure 2. Example Plant Maintenance Log Book Entries

As can be seen in the example for 3/20/2016, typical activities recorded include date and time of arrival, name of the employee, pH and chlorine readings, maintenance activities performed such as clearing bar screens of rags, and date and time of departure.

Distribution / Collection Systems

Maintenance activities within the distribution and collection systems is managed by the respective area manager. This includes repairs, rehab/replacement projects, inspections of lift stations, meter reading, and responses to customer service requests received via Oracle Customer Care & Billing (CC&B) field activities. Figure 3 shows an example of a CC&B field activity received by an area manager for a start/stop service request and meter read.

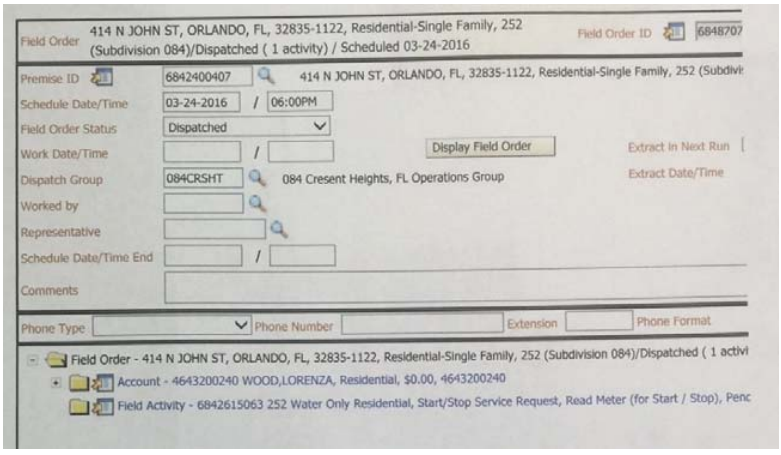


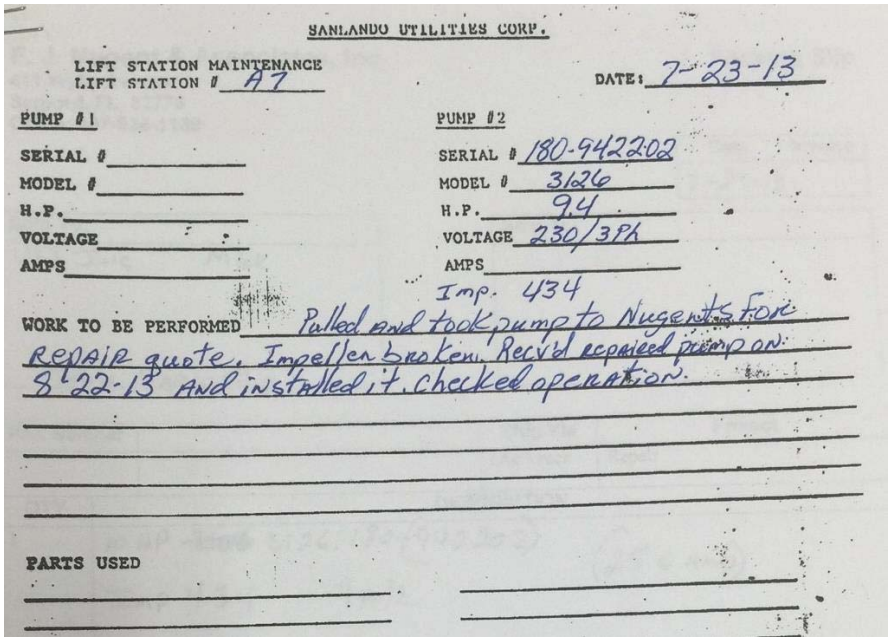
Figure 3. Example CC&B Field Activity (FA)

Meter readers use meter reading mobile devices to record readings and appropriate action codes associated with reading activities (e.g. animal present, etc.). It is not anticipated that the CMMS will

be utilized for or integrated with CC&B to support meter reading activities – this process currently functions efficiently and will continue to be utilized using current systems and workflows.

However, current work processes are such that customer service agents receive calls from customers (e.g. not a billing or payment question) that require action by field maintenance staff. These include shut offs and turn-ons, meter change outs, leak detection, and repairs/corrective maintenance. Calls originating from customers for these issues are recorded within CC&B and dispatched to area managers via CC&B field activities. A current challenge is that not all calls can be associated with a CC&B premise or a customer, which necessitates the generation of generic field activities (FA's) for recording purposes. In addition, efficiency/ease of use of CC&B has been identified as an issue – particularly for field staff who do not operate within CC&B for extended periods of time on a regular basis. One example is the need for 75 clicks or steps to record a meter changeout activity. Therefore, integration with CC&B, described in further detail in the Oracle Customer Care & Billing (CC&B) of this document, is recommended for a "quick win".

In addition to CC&B FA's, maintenance history is recorded within maintenance log books (similar to that as shown in Figure 2) and lift station maintenance logs as shown in Figure 4 which record not only the maintenance activities performed but also key asset nameplate data for each lift station pump/motor combination.


SANLANDO UTILITIES CORP.

LIFT STATION MAINTENANCE
LIFT STATION # A7

DATE: 7-23-13

PUMP #1		PUMP #2	
SERIAL #		SERIAL #	180-942202
MODEL #		MODEL #	3126
H.P.		H.P.	9.4
VOLTAGE		VOLTAGE	230/3PH
AMPS		AMPS	Imp. 434

WORK TO BE PERFORMED: Pulled and took pump to Nugents for repair quote. Impeller broken. Recvd repaired pump on 8-22-13 and installed it. checked operation.

PARTS USED

Figure 4. Example Lift Station Maintenance Log

The maintenance log books, lift station maintenance logs, and CC&B FA activities are all examples of information that will need to be easily recorded in the CMMS solution to support UI's eventual asset management program objectives.

SUPPORTING TECHNICAL INFRASTRUCTURE & SYSTEMS

The CMMS solution, although it may initially be hosted off-site until implemented within all regions, will eventually require implementation within UI's data center. Therefore, the selected CMMS

solution will need to support the technical architecture already established by UI information technology personnel. This will include the following:

- **Operating System:** Microsoft Windows on VMWare virtualized server infrastructure
- **Database Platform:** Oracle strongly preferred, Microsoft SQL Server if only other option
- **Business Intelligence Framework:** Business Objects (aka Crystal Reports) or Oracle BI Publisher
- **Office Productivity Suite:** Microsoft Office / Office 365
- **Web Browsers:** Firefox and Internet Explorer 11 (generally is a factor of what browsers are supported by CC&B)
- **Integration Framework:** Preference for integrations based on Microsoft .Net-based web services framework, open to other frameworks if necessary (e.g. JSP)

In addition to the technical architecture the eventual CMMS will be installed and supported within, there are also complimentary information systems that will at least share information with or potentially be integrated with the CMMS. These systems, and their potential points of integration, are listed below:

JD Edwards Enterprise One (JDE)

JDE is UI's financial management and accounting system. There are two possible points of integration with JDE.

The first is with the aggregation of assets into asset categories that correlate to JDE financial assets for depreciation tracking. For example, all of the pumps within Skidaway would be aggregated into a Skidaway Pumps asset classification that would depreciate in value per the depreciation schedule set within JDE.

The second potential point of integration with JDE is related to purchase order (PO) entry. Area managers are frequently generating PO's for purposes of acquiring parts to repair assets or replacing assets altogether. To accurately track infrastructure maintenance and replacement costs, it would be useful for the PO to house a field related to a CMMS work order number. The CMMS could then, on a scheduled basis, pull work order cost information into the CMMS and associate with the asset (which would already be associated with the aforementioned work order).

Oracle Customer Care & Billing (CC&B)

CC&B is UI's customer information and billing system for its 550 utility systems. All customer data, premise (point of service), meter, and consumption information is stored within the system. Meter reading data is fed into the system through a nightly process from the meter reading devices and used to derive customer bills.

Activities for meter readers and field maintenance staff are initiated through a CC&B field activity (FA). As previously discussed, calls come into the customer service representatives (CSR's) where information is recorded either at a premise level or, in cases where there is no associated premise, generic "catch-all" premise. Field activities are generated and then routed to the area managers to address.

Through discussions with the project team, there is an opportunity with the field activities to integrate with the CMMS to create a more efficient and user friendly means to dispatch, assign, complete, and record the necessary information related to these issues in a single application – the

CMMS. To do so will require integration between CC&B and the CMMS. Figure 5 provides a concept that identifies the necessary workflow points of integration between the CMMS and CC&B.

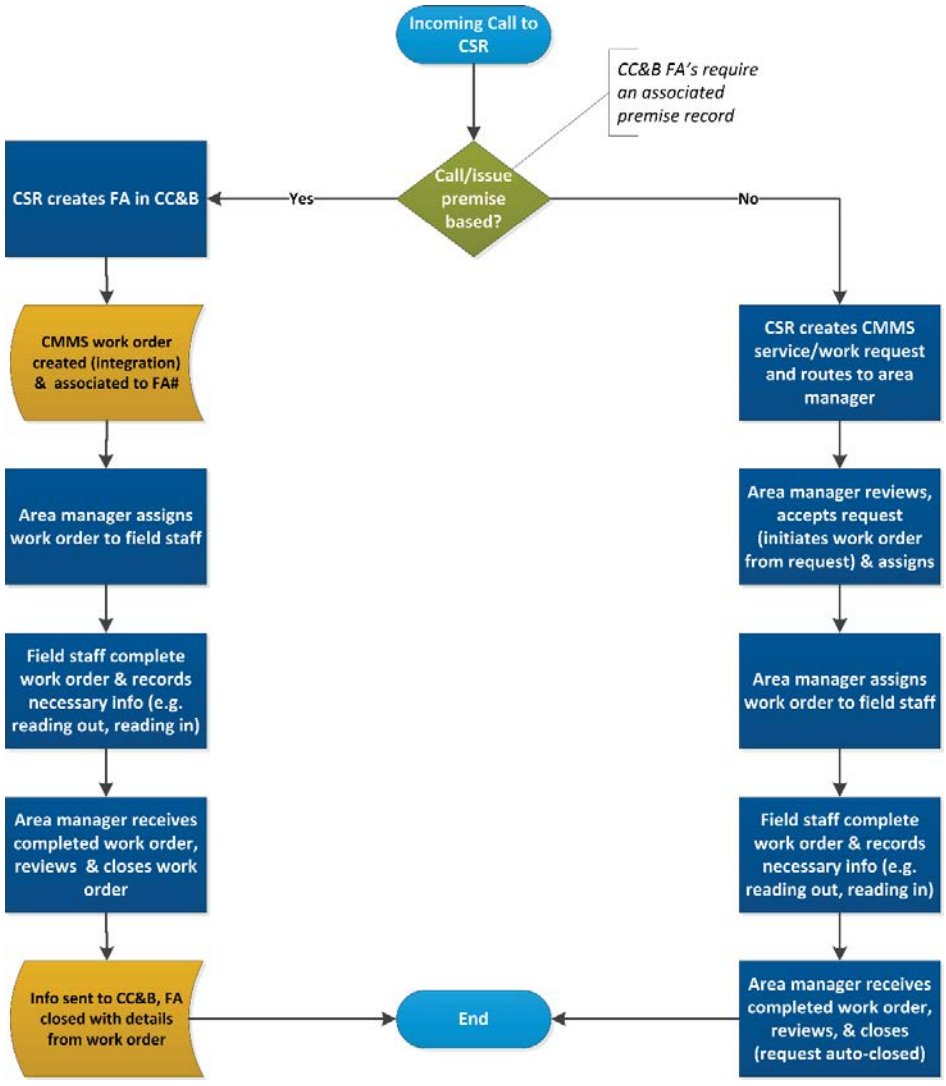


Figure 5. Conceptual CMMS and CC&B Integration Workflow

By integrating CC&B and CMMS utilizing the approach identified above, both area managers and field staff can simplify operations by receiving, assigning, and completing all maintenance activities utilizing a single system of entry – the CMMS. An additional benefit of integration with CC&B would be to increase the efficiency of current data entry processes. For example, integration could potentially reduce the current "75 clicks" necessary for executing a meter changeout within the CC&B user interface.

Paychex

Paychex is the system utilized by UI for human resource information and management. Key information stored within Paychex is a list of employees and employee ID's. Rather than an

extensive integration, Paychex would be a likely data source for populating and updating the CMMS solution with up to date employee information (e.g. lists of employees to assign to security groups, employees to route work orders to for completion, etc.). A regularly scheduled batch process to export lists from Paychex and import into to the CMMS would facilitate the limited amount of data sharing necessary between these two systems.

BrightWork

For project and portfolio management, UI utilizes BrightWork on the Microsoft SharePoint platform. Although no initial integrations with BrightWork are currently planned, there is the potential for integration between the CMMS and BrightWork in the future. The likely point of integration would be for capital infrastructure projects and the associated work orders to rehab or replace infrastructure assets under that capital project budget.

CMMS Functional Requirements

Following review of the business processes and operating environments within a sample of UI's utility systems, Black & Veatch has organized specific functional requirements that will be necessary for the eventual CMMS solution to support UI's business needs. The following tables identify the key requirements necessary and have been organized into broad categories for reference purposes.

GENERAL SYSTEM REQUIREMENTS

Table 1. General System Requirements

REQ ID	DESCRIPTION
GEN-1	User-friendly, interface configurable to facilitate call taking service/work request processing and work order generation, within and directed from a GIS environment
GEN-2	Offer web based browser solution using Esri ArcGIS Server technology including REST services
GEN-3	Supports a mobile workforce by allowing users with wireless connectivity to access all system functionality
GEN-4	Supports simultaneous multi-user access with appropriate record locking (or similar process) to ensure data integrity through relational database (e.g., how will software handle multiple users simultaneously editing the same work order)
GEN-5	Ability to locate and zoom to using address location service including GIS centerline or parcel/premise address and viewed within the application
GEN-6	Ability to identify features, display infrastructure assets attributes, asset work history, and any pending work with and without a map
GEN-7	Allow users to select (by defining a geographic area on a map) assets in a GIS viewing application and display all assets, asset condition, work history, and pending work information associated to those records
GEN-8	Allow users to select (by defining a geographic area on a map) assets in a GIS viewing application and create work orders associated to the selected assets
GEN-9	Capability to search and view Service/Work Request, Inspections and Work Order locations with and without a map
GEN-10	Provide common GIS mapping tools (Zoom In/Out, pan, identify) within the CMMS and GIS viewing application
GEN-11	Ability to filter a list of assets for assets found in a geographic area
GEN-12	Ability for user to access, maintain and edit asset information directly within the CMMS
GEN-13	Zoom to the problem area in the GIS viewing application from a given address, intersection, location description, facility name or number, and/or x, y coordinates as entered into the CMMS.
GEN-14	Ability to define user defined (or custom) fields for all record types (assets, employees, work orders, tasks, etc.) using all potential field types (text, numeric, list of values, true/false, date, etc.).
GEN-15	Ability to change labels on user screens
GEN-16	Ability to move fields on any screen
GEN-17	Ability to set up custom views for different organizational units (e.g. regions or states)

REQ ID	DESCRIPTION
GEN-18	Ability to hide or un-hide fields on any screen
GEN-19	Provides online and easy to use Help system
GEN-20	Runs in a browser based environment
GEN-21	Data or output export capabilities (CSV or MS Office format)

WORK & ASSET MANAGEMENT

Table 2. Basic Work & Asset Management Requirements

REQ ID	DESCRIPTION
WAM-1	Ability to define work order activity types for any asset type defined in GIS
WAM-2	Ability to define work order activity types for any asset type not defined in GIS
WAM-3	Ability to create work requests from inside the GIS viewing application
WAM-4	Track relationship between service/work request and work order
WAM-5	Allows assigned personnel to select and review work requests and work orders using multiple selections and sorting criteria that include all work request and work order fields
WAM-6	Allow work orders to include multiple assets and asset types. For example all motors and pumps in an area of a plant.
WAM-7	Automatic notification of new work request and work orders to sender and user assigned to receive notification
WAM-8	Ability to manage asset information for the following types of water distribution system assets (indicates required integration with GIS): • Distribution mains (yes) • System valves (yes) • Control valves (yes) • Fire hydrants (yes) • Backflow preventers (yes) • Storage tanks (yes) • Booster station facilities (yes) • Generators (yes) • Customer meters (yes) • Large meters (yes) • Booster station equipment such as high service pumps, motors, chemical feed pumps, interior valves and piping, etc. (no)
WAM-9	Ability to manage asset information for the following types of wastewater collection system assets (indicates required integration with GIS): • Force mains (yes) • Gravity mains (yes) • Manholes (yes) • Force main valves (yes) • Lift station facilities (yes) • Generators (yes) • Grease traps (yes) • Lift station equipment such as pumps, motors, interior piping and valves, etc. (no)

REQ ID	DESCRIPTION
WAM-10	Ability to manage asset information for equipment and process structures within a water production facility (plant) such as pumps, motors, floc/sed basins, clarifiers, etc. No GIS integration required.
WAM-11	Ability to manage asset information for equipment and process structures within a wastewater treatment facility (plant) such as pumps, motors, clarifiers, bar screens, belt presses, etc. No GIS integration required.
WAM-12	Ability to manage asset information for equipment utilized in the conducting of maintenance such as backhoes, dump trucks, crew trucks, etc. No GIS integration required.
WAM-13	Ability to manage asset information for small equipment/tools such as pipe saws, portable pumps and generators, etc. No GIS integration required.
WAM-14	Ability to manage asset information for buildings/facilities components such as structure, roof, HVAC, Mechanical/Electrical/Plumbing (MEP). No GIS integration required.
WAM-15	Allows maintenance staff to enter preventive or standing maintenance rules that trigger the automatic creation of work orders
WAM-16	Preventive Maintenance includes elapsed time since the last work order was created or completed
WAM-17	Ability to schedule seasonal or cycle PMs, for instance, schedule activities “between June-September”
WAM-18	View duration, material, and tool cost anticipated for a PM
WAM-19	Includes associated work request ID (with complaint codes, description, location, and contact information) with link between request and work order
WAM-20	Ability to attach multimedia files to work order
WAM-21	Ability to attach document files (MS Word, PowerPoint, Excel, TIF, PDF) to work order
WAM-22	Includes instructions and comments to and from workers
WAM-23	Allows assignment of Work Orders to Individuals, Crews, or outside Contractors
WAM-24	Initiates Warranty inspections for new assets of new components
WAM-25	Ability to assign work by geographic area
WAM-26	Provide the ability for system administrators to define and modify workflows that control the work order and asset lifecycle
WAM-27	Display the screening backlog for a specific business unit (i.e., a list of all work orders showing brief description, priority levels and the date-time requested). Allow users to pull up a work order from the screening backlog for reviews and authorization or cancellation
WAM-28	Provide the automatic processes to warn screeners if the type of work requested for an asset is addressed by an existing open work order for the same asset
WAM-29	Captures and stores for assets the results of various inspections including but not limited to well pump efficiency testing and operational and routine inspection observations
WAM-30	Ability to create custom Inspections
WAM-31	Tracks total work history on physical assets that can be moved (e.g., a pump can move location, but total work performed on that pump needs to be retained). History of locations asset (such as a pump) has been installed available at all times.

REQ ID	DESCRIPTION
WAM-32	The ability to retrieve work history for retired, abandoned or removed assets
WAM-33	Ability to hold and analyze risk data including asset criticality/Consequences of Failure (CoF) Ratings, Probability of Failure (PoF) based on age and/or condition and ability to create a Risk Mapping Matrix
WAM-34	Ability to conduct and record hydrant flow testing results including date/time of test, employee conducting test, and flow test quantitative results.
WAM-35	Ability to plan, route and conduct dead end line flushing including calculation of non-revenue water loss based on flushing duration and flow.
WAM-36	Ability to conduct and record large meter testing and calibrations utilizing volumetric calibration method.
WAM-37	Provide ability to create and utilize work templates (partially pre-populated work orders for quick and efficient work order generation)

SECURITY & ACCESS CONTROL

Table 3. Security and Access Control Requirements

REQ ID	DESCRIPTION
SEC-1	Ability to segregate different organizations within the single CMMS solution (aka multi-tenant environment). For example, prevent Florida users from accessing Georgia work orders or asset records and vice versa.
SEC-2	Users must have permissions to log into multiple organizations (states or regions) if applicable. If they belong to multiple organizations, they must be allowed to see the organizations they have access to
SEC-3	Ability to define granular levels of access to different user roles. Examples include: • Limiting cost information to certain security groups • Defining create, edit, view, or delete rights to different user groups associated with work orders, work/service requests, and asset records • Limiting ability of different user groups to utilize different status codes on work orders or assets (e.g. group A cannot close a work order but group B is allowed to close a work order)
SEC-4	Provide an audit trail for edits to service/work requests and work orders, showing the date and time a record was changed, the user who made the change, and the before and after values of the fields that were modified
SEC-5	System administrators must be able to define a particular field as required (e.g. must be populated before record can be saved) and to make the requirement that a field must be populated contingent upon the value of another field in the same record, including but not limited to the records' Status field
SEC-6	Provide the ability to administer user accounts and system permissions, including: • Create and change system logins (usernames) and passwords • Define standard system permissions for user groups and assign users to one or more groups • Monitor system usage and terminate sessions • Set a time period of inactivity after which user will automatically be logged out of system

REPORTING

Table 4. Reporting & Business Intelligence Requirements

REQ ID	DESCRIPTION
REP-1	The system shall work with standard SQL based report writers where the user can modify existing reports or create new reports based on specific user requirements.
REP-2	Allow users to schedule reports to run automatically on a defined schedule for a defined distribution list
REP-3	Ability, through a standard user interface providing selection and filtering of different data fields, to create and save custom or “ad-hoc” reports
REP-4	Ad hoc query interface with export to Microsoft Office applications
REP-5	Ability to modify standard system reports
REP-6	Ability to create dashboards that display KPIs (key performance indicators)
REP-7	Ability to create homepage/dashboard for individual users containing links to critical information for each user

CMMS Technical Requirements

The following tables identify the technical requirements (supported architecture, mobile, and integration capabilities) for UI's eventual CMMS solution.

SUPPORTED ARCHITECTURE

Table 5. Supporting System Architecture Requirements

REQ ID	DESCRIPTION
ARCH-1	Supported on virtualized (via VMWare) Windows Server 2012 operating system (for database and application server components).
ARCH-2	Supported on Windows 7, 8, and 10 for client workstation environment.
ARCH-3	Supported on Oracle 10g and 11g database platform.
ARCH-4	Supports use of Business Objects (Crystal Reports) for reporting framework.
ARCH-5	Supports use of Oracle BI Publisher Suite for reporting framework.
ARCH-6	Supported on Internet Explorer 11 web browser.
ARCH-7	Supported on Mozilla Firefox 42.0 or later web browser.

MOBILE CAPABILITIES

Table 6. Mobile Requirements

REQ ID	DESCRIPTION
MOB-1	Supports a mobile workforce by allowing disconnected use (e.g. store and forward).
MOB-2	Supports a mobile workforce by providing an iOS system environment.
MOB-3	Supports a mobile workforce by providing an Android system environment.
MOB-4	Offer mobile solution with ESRI map services for REST services.
MOB-5	Supports a mobile workforce by allowing users with wireless connectivity to access all system functionality.

INTEGRATION

Table 7. Integration Requirements

REQ ID	DESCRIPTION
INT-1	Must provide a flexible and open method (e.g. web services) allowing for the ability to link to 3rd party software, tools or data for asset condition modeling, depreciation and valuation
INT-2	The data structure should allow integration with other systems with open databases. Data model is documented and provided to software licensees.
INT-3	Ability to accept SCADA run times for specific assets
INT-4	Ability to accept other measurement point values from SCADA (e.g. temperature thresholds)
INT-5	Integration with ESRI GIS software v10.1 or higher
INT-6	Provides tools or framework for creating new custom integrations with other systems.

Compatible Vendor Solution Summaries

Black & Veatch CMMS technical and implementation experts reviewed the operating environment, relevant workflows, and functional and technical requirements for UI's use of a CMMS solution. In doing so, several commercial off the shelf vendor solutions were assessed to determine compatibility with UI's goals for the use of a CMMS. Key differentiating factors that eliminated several vendor solutions included the following:

- **GIS Integration** – several solutions had either none or very cursory GIS integration capabilities. Given UI's focus on GIS as the asset repository for distributed assets, strong GIS integration capabilities are key to the CMMS solution's success. In addition, total dependence upon a GIS as the asset repository was also not desired therefore eliminating GIS-centric solutions.
- **Water/Wastewater Industry Specific Functions** – UI has requirements for tracking hydrant flushing, water loss, and valve exercising in the water distribution systems and PACP defect observations in the wastewater collection systems. CMMS solutions that had built-in capabilities to support these functions were given precedence over that those that required extensive configuration to support.
- **Systems Integration Framework** – a successful CMMS solution for UI will require integration with other key information systems such as Oracle Customer Care & Billing (CC&B). CMMS solutions that did not provide robust and proven integration frameworks using modern integration techniques such as web service frameworks were excluded from the list of compatible solutions.
- **Cost** – although functionality was deemed to be important, the overall cost of acquiring, implementing, finding and retaining suitably skilled staff to administer, and maintaining the ultimate CMMS solution was evaluated as a compatibility quality in and of itself. Overly expensive solutions that did not fit UI's long term budgetary needs or solutions where it has been historically difficult to attract, train, and retain system administration staff were also excluded as compatible solutions.

As a result, the following solutions were reviewed and excluded as possible compatible solutions for UI's CMMS solution:

- Accela Asset Management
- Antero
- AssetPoint
- Cityworks
- IBM Maximo
- MicroWest AMMS
- Oracle WAM
- SAP
- TMA Systems WebTMA

SPECIAL CONSIDERATIONS

Special consideration was given to the review of both the current JD Edwards financial management system (which contains some asset management related functionality) as well as the Oracle Work and Asset Management product suite.

The current JD Edwards solution in use at UI does provide some asset and maintenance management functionality. However, these capabilities are centered primarily around fixed asset registries and fixed asset depreciation. Although very simplistic work order capabilities are available for recording generic maintenance activities as work orders against assets, these capabilities are insufficient to support UI's larger CMMS needs. Finally, JD Edwards provides no GIS integration capabilities which is critical requirement of the eventual CMMS solution. Therefore, JD Edwards is not recommended as a compatible CMMS solution.

With regards to the Oracle WAM product, this presents a unique possibility due to the requirement to integrate with the CC&B product for key maintenance workflows. Although this is a definite positive for the Oracle product, other deficiencies in the solution also removed it from consideration. The GIS capability, while stronger than JD Edwards, is still very basic and inadequate when compared to UI's functional requirements. WAM is a product well suited for large, complex plant/facility environments and excels for those types of implementations. However, for a mixed environment containing several linear and distributed asset types several functional workarounds will be required in order to address UI requirements. Lastly, licensing and implementation costs for an Oracle solution will be well above UI's intended budget for the CMMS implementation while also presenting challenges related to finding and retaining resources to maintain and manage the solution.

RECOMMENDED VENDOR SOLUTIONS FOR CONSIDERATION

To develop software licensing cost comparison information for the solutions that were compatible with UI's requirements, identical requirements were provided to each vendor as follows:

- Licenses to support 350-400 end users.
- Regardless of how software modules were licensed, include licenses to support basic asset management (asset info, hierarchy, condition and risk information), work management (work orders, work requests, preventive maintenance schedules), and support for water distribution assets, wastewater collection assets, plants, equipment, and facilities.
- Include any required modules to support GIS integration.
- Mobile licenses for up to 350 mobile users.
- Include software licensing costs only – no professional services at this time.

The following tables provide a summary of the compatible solutions and their estimated software licensing costs for UI.

Table 8. LucityAM Information

SOLUTION – LUCITYAM	
Vendor	Lucity (www.lucity.com)
Description	LucityAM is a comprehensive suite of integrated COTS software solutions for Public Works and utilities organizations that enables agencies to meet their demands for management of assets, customer requests and work orders,

SOLUTION – LUCITYAM	
	preventive maintenance, resources and inventory, best practices and regulatory compliance. LucityAM provides several different methods to access the system including a desktop (thick) client, web client, and mobile solutions. Deployment is available as both an on premise and SaaS solution.
Strengths	LucityAM has strong GIS integration capabilities utilizing Esri's ArcGIS Server framework. However, it is not dependent upon GIS integration for all assets. Some asset types (such as linear assets) may be integrated with GIS whereas others (such as vertical assets inside a plant environment) do not need to be integrated with GIS. LucityAM contains functionality specific to operating and maintaining utilities including hydrant flow testing, meter calibration, dead end line flushing, non-revenue water loss tracking, and CCTV inspections and defect tracking. Lucity provides both a full documented data model, data import/export tools for extract-transact-load transactions, and a REST API to support web services integration. Lucity (originally GBA MasterSeries) has a strong financial history and large customer-base. For purposes of implementation, Lucity both implements the software utilizing in-house implementation consultants as well as relies on qualified implementation partners providing a greater capacity to execute and support implementations.
Weaknesses	The Lucity Web Client currently still makes use of and requires Microsoft Silverlight technology for rich web content presentation. However, although Silverlight is supported by Microsoft through 2021, Lucity is in the process of re-architecting the web client to be fully HTML 5 compliant.
Licensing Model & Estimated Costs	LucityAM licenses specific software modules for water distribution (including storage tanks and pump/booster stations), wastewater collection (including lift stations), plants/equipment, facilities, and work management (work orders, work/service requests, PM/work order templates, etc.). Licenses are based on a named user or site license basis. Given the number of likely users (350-400), the most cost effective licensing model is a site license for UI. Lucity offers two purchasing approaches for this licensing model. One is to purchase the licenses outright (with a larger upfront cost) followed by annual maintenance and support. The second is to purchase as a subscription with a set annual cost. Option 1 (higher initial cost with lower annual maintenance and support) would be $255,000 in year 1 with $51,000 per year starting in year 2 for annual maintenance and support. Total 5-year cost would be ~$460,000. Option 2 (lower up front but higher annual subscription costs) would be $103,000 per year for a total 5-year cost of $515,000.

Table 9. EnerGov Public Maintenance Management Suite Information

SOLUTION – ENERGOV PUBLIC MAINTENANCE MANAGEMENT SUITE	
Vendor	Tyler Technologies (www.tylertech.com)
Description	EnerGov's Public Maintenance Management Suite is a comprehensive set of tools to support infrastructure management, work orders, cost assessment, and resource allocation and routing. Modules are provided for Asset Management, Work Order/Maintenance Management, Request Management, Inspections and Investigations. EnerGov provides both web and mobile access to the solution along with GIS integration capabilities utilizing Esri's ArcGIS Server framework.
Strengths	EnerGov's solutions were designed with the mobile user in mind and offer the strongest and most functional mobile capabilities of any of the compatible solutions. Recently acquired by Tyler Technologies, EnerGov is a financially strong company with a history of successful implementations.
Weaknesses	EnerGov is the sole implementer of its software solution. In the last 18-24 months EnerGov has had great success winning new clients both in the CMMS and permitting markets. However, clients have expressed concerns with EnerGov's capacity to execute and adequately support implementation efforts.
Licensing Model & Estimated Costs	EnerGov also provides 2 licensing models. Option 1 would be hosted on-premise with a site license for unlimited users (over 200 users is the threshold where it is cost effective to go to a site license). Option 2 would be EnerGov's hosted solution at $169 per user per month. Option 1 would be $699k in year 1 with $140k annually starting in year 2 for maintenance and support and total 5-year cost of $1,259,000. Option 2 would be $709k annually with a total 5-year cost of $3,549,000.

Table 10. Infor EAM Information

SOLUTION – INFOR EAM	
Vendor	Infor EAM (www.infor.com)
Description	Infor EAM is an enterprise-grade asset management solution that provides the capability to improve capital asset management in ways that increase reliability, enhance predictive maintenance, ensure regulatory compliance, reduce energy usage, and support sustainability initiatives. EAM is deployable in both an on premise and cloud-based SaaS architecture and provides the most robust multi-tenant capabilities of any of the compatible solutions.

SOLUTION – INFOR EAM	
Strengths	EAM provides the most robust framework for supporting an advanced asset management program. The asset and maintenance management components support asset and position/location relationships (e.g. pump installed then moved to different locations and tracking overall maintenance history as well as history at each location) as well as condition monitoring and predictive maintenance (PdM) triggers for maintenance activities. The EAM product was acquired by Infor through the acquisition of the Datastream 7i product and firm several years ago. Infor has successfully integrated EAM into their product catalog and has a well-established user base. Infor relies on both in-house implementation consultants as well as a small set of qualified implementation partners.
Weaknesses	The GIS integration for Infor EAM is not as user friendly as that within other compatible solutions and requires specific data maintenance workflows in order to foster a sustainable relationship between GIS and CMMS.
Licensing Model & Estimated Costs	Infor also offers 2 different licensing models – on premise and SaaS. Option 1, on premise, would require a year 1 investment of $1,220,000 with annual maintenance and support of $244k in years 2-5 for a total 5-year cost of $2,196,000. Option 2, SaaS, would require an annual subscription fee of $645k for a total 5-year cost of $3,225,000.

Table 11. Cartegraph Operations Management System (OMS) Information

SOLUTION – CARTEGRAPH OMS	
Vendor	Cartegraph (www.cartegraph.com)
Description	Cartegraph OMS is designed specifically for local government and utilities organizations. With its emphasis on efficiency and usability, Cartegraph enables agencies to manage enterprise assets in direct tandem with the work, resources, and requests at the center of their operations. OMS contains functionality specific to operating and maintaining utilities including hydrant flow testing, meter calibration, dead end line flushing, non-revenue water loss tracking, and CCTV inspections and defect tracking. Cartegraph OMS is available for deployment both as an on premise and SaaS solution.
Strengths	OMS has robust mobile solutions (based on iOS platform) and, from an end-user standpoint, strong and user-friendly GIS integration capabilities. The OMS mobile solution is very tailored to the tablet environment and easy to use.

SOLUTION – CARTEGRAPH OMS	
	OMS functionality is tailored to municipal and utility organizations with very specific functionality to support utility operations and maintenance.
Weaknesses	The OMS mobile solution does not have store and forward (aka disconnected) capabilities. Configuration of the GIS integration can be challenging and, once configured, offers very little flexibility to accommodate schema changes. OMS has the least capabilities to support multi-tenant environments which will necessitate separate databases for each region/state. OMS requires the use of Esri's ArcGIS Portal framework which will increase UI's overall GIS licensing costs (vs integration with GIS utilizing an internally hosted ArcGIS Server environment).
Licensing Model & Estimated Costs	Cartegraph OMS is licensed on a named user basis. Cartegraph licensing costs would be $271k in year 1 with annual maintenance and support costs of $54k in years 2-5 for a total 5-year cost of $487,800.

RECOMMENDED NEXT STEPS

As shown in the tables above, UI has several options at its disposal for selecting a CMMS solution that will integrate well with the GIS. None of the recommended options present a clear functional superiority (or deficiencies) when compared to UI's requirements. The exception to this in the licensing and maintenance costs. Given those circumstances, Black & Veatch would recommend evaluation the two most cost effective solutions (Lucity and Cartegraph) for selection. Should neither of those solutions provide for a convincing solution following demonstrations, the other compatible solutions could be evaluated further as possibilities.

In early 2016, the GIS Asset Management Advisory Group, made up of representatives from each of the UI Business Units, along with David Kitching, Director, Engineering and Asset Management, Corix Infrastructure, Inc. selected Black & Veatch to assist the company in the evaluation, selection and implementation of GIS and asset management software products.

Black & Veatch held a 2-day Computerized Maintenance Management System (CMMS) workshop in the Altamonte Springs, FL office on March 21 & 22 with members of the Core Team including David Kitching, Jim Devine, Tom Ostler, Martin Scanlon, Ron Medders, James Eason, Nate Carver and Patrick Flynn. The purpose of the workshop was to identify UI's key workflows and functional and technical requirements of a CCMS solution. Nearly 100 specific CCMS requirements were identified through this process in these categories –

- General System Requirements
- Work & Asset Management
- Security & Access Control
- Extracting Data & Report Generation
- Supported IT Architecture
- Mobile Capabilities
- Integration

In mid-May, Black & Veatch prepared a report entitled "CMMS Requirements Analysis & Recommendations" in which the specific CMMS requirements as well as criteria to evaluate various products were established. Criteria included strong GIS integration, specific water & wastewater functions, integration with Oracle Customer Care & Billing system and reasonable cost. Initially, ten potential CMMS solutions were identified with four vendors short-listed based on the criteria as shown below:

Solution	Pros	Cons	Capital (1-time)	O&M (Annual)	Rev Req't
LucityAM	- Good GIS integration - Handles Vertical Assets well - Good W/WW functionality - Good Web services integration - Good implementation options	- Uses Microsoft Silverlight (currently architecting for HTML 5)	$255k	$51k	$111k
EnerGov	- Strong mobile solution	- Implementation only by vendor and is weak	$699k	$140k	$305k
Infor EAM	- Supports most advanced AM	- GIS integration not user-friendly and heavy on up-keep	$1,200k	$244k	$532k
Cartegraph OMS	- Good mobile solution/ user friendly - Good utility-specific functionality	- Does not have disconnected mode. - GIS configuration difficult and inflexible - Would require separate database for each region - Will have higher Esri costs.	$271k	$54k	$118k

The Core Team evaluated these products and providers' ability to meet five key criteria including:

1. Configurability – can be adapted easily
2. Business-focused functionality – must include specific water & wastewater workflows
3. Integration with GIS
4. Overall System & Integration Architecture – must integrate with Oracle products
5. Mobile solutions for field operators with and without internet connectivity

Through this process, the field was narrowed to two providers, Lucity (a Gold tier Esri partner) and Cartegraph (a Platinum tier Esri partner). These companies demonstrated their products to the Core Team at the Northbrook, Illinois office on August 10 and 11, 2016. Prior to the presentations, Black & Veatch created and distributed to the Core Team members a weighted scoring matrix for the CCMS requirements with each item ranked as a High, Medium and Low priority.

Both companies were asked to demonstrate the following:

General System Functionality - creating various dashboards, navigating within a GIS viewer and selecting and updating specific asset information

Building & Maintaining the Asset/Equipment Database – management of water and wastewater assets as well as equipment and facility assets

Service/Work Request Creation, Assignment & Resolution – reactive work orders and preventive work orders

Inspection Creation, Fulfillment & Closure

CMMS Mobile Capabilities & Security Features

CMMS Reporting & Integration Capabilities

Subsequently, site visits to clients using these products were arranged. Ron Medders, Martin Scanlon and Jill Strickler visited Grand Strand Water & Sewer Authority in the Myrtle Beach, SC area on

August 26 to witness how this utility was using Lucity and to discuss the advantages and disadvantages of this software product. In addition, Jim Devine and Tom Ostler visited the town of Buffalo Grove, IL to see how the water & wastewater utility was using Cartegraph. Tom and Jim also visited the Village of Wheaton, IL on September 1, whose staff also uses Lucity. Also, Patrick Flynn spoke at length by telephone with Joe DeVito of Beaufort – Jasper Water & Sewer in SC on August 18 about his experience using Lucity since 2008.

On August 29th, a conference call was held with Joe North of Black & Veatch and the Core Team members to review the presentations and the resulting scoring matrices for both Lucity and Cartegraph. In addition, the group discussed the site visits and how other utilities are using these products. Although Cartegraph appeared to offer more advanced Asset Management and financial tools, Lucity is compatible with Oracle products and offers imbedded Crystal Reports. Lucity is also more user friendly and customizable with an easy import/export tool. Lucity's mobile offline capability was also judged to be far superior to Cartigraph's. The Core Team then shared their observations and key concerns that differentiated the two CMMS providers. The Core Team was unanimous in favoring Lucity.

Supporting Documentation:

- Prioritized CMMS Requirements
- CMMS Demonstration Agenda and Scenarios
- Scoring Matrix
- Vendor Responses to Prioritized CMMS Requirements
- Vendor Presentations
- B&V Demonstration Results Presentation