ROYAL WATERWORKS, INC.

April 30, 2020

Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket No. 20190170-WS - Application for transfer of facilities Certificate Nos. 259-W and 199-S in Broward County from Royal Utility Company to Royal Waterworks, Inc. – Supplemental Response to Staff Second Data Request

Dear Commission Clerk,

Royal Waterworks, Inc. (Royal) hereby submits its supplemental response to Staff's Second Data Request dated March 31, 2020 in the above referenced docket.

The staff requested information on cost savings related to the acquisition adjustment. The attached Assessment of Royal Utility Company was performed in April 2016 for the former owner. The Assessment was performed by Bevin Beaudet, P.E., LLC. In its Assessment, the engineer recommended several capital improvements totaling approximately $4,000,000. These included:

- Complete renovation of the systems wells and critical water treatment plant components which have greatly exceeded their Average Service Lives as listed in FAC 25-30.140 (2) (a), are well beyond their useful lives and in great need of substantial repair and replacement.
- Replacement of the obsolete and limited process control and Supervisory Data Control and Acquisition (SCADA) system to improve ability to safely monitor and control not only the water supply, treatment and distribution system but also the wastewater collection and pumping system. The in-plant SCADA system will also result in significantly optimized drinking water disinfection.
- Capital repairs to the older parts of the wastewater collection and pumping system which exceed their Average Service Lives and useful lives and which are in great need of repair.
- Installation of an Anionic Ion Exchange treatment component to the existing water treatment system will greatly improve water quality by removing over 65% of the Total Organic Carbon which includes precursors of chlorine by-products as well as other organic chemicals of concern. This new process, which is very cost effective operationally, will provide a higher quality of drinking water in compliance with applicable standards.

4939 Cross Bayou Boulevard ~ New Port Richey, Florida 34652
Tel: 727-848-8292

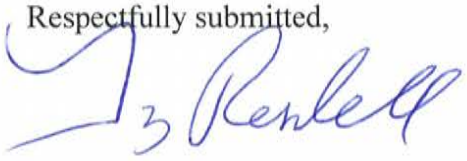
In addition, the Assessment stated, "The proposed Anionic Exchange system has minimal operational costs as compared to the existing overall system, estimated to be less than $50,000 per year increase."

The current owner, through its extensive years of experience in water and wastewater determined that the majority of these capital items were not necessary. There were improvements made to both the water and wastewater systems, but at a substantially lower costs. In addition, by not adding the anionic exchange, this also avoided the estimated increase in operation expenses of the $50,000 contained in the Assessment.

These management decisions by the current owner provided substantial savings to the customers through cost avoidance.

Also attached to this response is a Valuation Report conducted by CJNW, the previous owners CPA firm. This valuation was prepared for the purpose of requesting an acquisition price from the City of Coral Springs for the purchase of Royal. The valuation presented to the City of Coral Springs valued the utility between $6.8 million to $7.97 million. Thus when examining the requested acquisition adjustment, Royal Waterworks requests the staff to take this into consideration as well.

Respectfully submitted,



Troy Rendell
Vice President
Investor Owned Utilities
// for Royal Waterworks, Inc.

ASSESSMENT OF ROYAL UTILITY COMPANY, INC.

Coral Springs, Florida

April 2016

Prepared By

Bevin A. Beaudet, P.E., LLC

Volume 1 Report

Prepared For

Royal Utility Company, Inc.

Coral Springs, Florida

Original Hard Copies

Presented to Client and Public Agency

Signed and Sealed by

Bevin A. Beaudet

Florida, P.E. 23484

ASSESSMENT OF ROYAL UTILITY COMPANY, INC.
CITY OF CORAL SPRINGS, FLORIDA

April 2016

Prepared By

Bevin A. Beaudet, P.E., LLC

Prepared For

Royal Utility Company

Volume 1 Report

Bevin A. Beaudet, P.E., 23484

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Section 1 – Executive Summary

Royal Utility Company (RU) provides water and sewer service within a half square mile service area to 4,300 Coral Springs residents. Units served include 414 single family homes, 1,010 multi-family units and two large commercial developments known as Royal Eagle Plaza and Riverside Square. The service area began to be developed in 1975 and the RU water and wastewater system was built in 1975 to provide utility service to the area. Development of the service area was substantially complete by 1995.

Over the years, as the service area has matured, Royal Utility has conscientiously maintained its equipment and assets and has provided reliable and quality service to its customers. Note, however, that the system is over 40-years old and critical components have far exceeded their useful service life. Furthermore it is increasingly questionable that the water treatment methods and process control technology of the system are adequate to provide a sustainable level of regulatory compliance and customer safety now and in the future.

This report was commissioned to inspect in detail the condition and performance of the RU system, to determine its condition and remaining useful life, if any, and to recommend capital repairs and operational changes that would allow RU to continue to operate successfully and in full regulatory compliance into the future. The future performance goal represented in this report is for a high standard of reliability, water quality and compliance with all requirements of FAC 62.550. Improvements to the treatment process are recommended to increase the margin of safety for RU's customers in meeting current chlorine by-product rules and to improve disinfection results to potentially meet a 4-log virus removal standard. These recommended improvements are also planned to meet reasonably anticipated rules not only for chlorine by-products but also other organic chemicals, such as pharmaceuticals and other organic contaminants currently being evaluated by the USEPA.

A summary of the report's recommendations includes:

- Complete renovation of the systems wells and critical water treatment plant components which have greatly exceeded their Average Service Lives as listed in FAC 25-30.140 (2) (a), are well beyond their useful lives and in great need of substantial repair and replacement.

- Replacement of the obsolete and limited process control and Supervisory Data Control and Acquisition (SCADA) system to improve ability to safely monitor and control not only the water supply, treatment and distribution system but also the wastewater collection and pumping system. The in-plant SCADA system will also result in significantly optimized drinking water disinfection.

- Capital repairs to the older parts of the wastewater collection and pumping system which exceed their Average Service Lives and useful lives and which are in great need of repair.

- Installation of an Anionic Ion Exchange treatment component to the existing water treatment system will greatly improve water quality by removing over 65% of the Total Organic Carbon which includes precursors of chlorine by-products as well as other organic chemicals of concern. This new process, which is very cost effective operationally, will provide a higher quality of drinking water in compliance with applicable standards.

Total capital costs of the report's recommendations are $4,000,000. Incremental operational costs will be minimal as the basic treatment process units and wastewater collection system will remain the same. Addition of the SCADA system may at some point in the future reduce additional operational costs as compared to the existing manual controls. The proposed Anionic Exchange system has minimal operational costs as compared to the existing overall system, estimated to be less than $50,000 per year increase.

Section 2 – Purpose and Scope

The purpose of this study is to present a thorough evaluation of Royal Utility (RU) for use by the utility and the Florida Public Service Commission in determining necessary capital upgrades for the utility to continue to safely and reliably serve its customers in the long term and in order to meet existing and anticipated future regulatory requirements. This evaluation is based on a detailed inspection of existing facilities as well as a review of pertinent operating and water quality data as reported to the Florida Department of Environmental Protection (FDEP). The physical inspection and evaluation of the wells, water distribution system and wastewater collection system was performed in August and September 2015. The physical inspection and evaluation of the water treatment plant was performed in February and March of 2016. This report presents an independent estimate of the cost of bringing the current aging facilities up to the aforementioned standard moving forward. Failure to implement the recommended capital improvements will, in my opinion, compromise the ability of RU to continue reliable service that meets all regulatory requirements. The resultant cost of bringing the system up to such a required standard is summarized and detailed in this study.

Section 3 – Description of Royal Utility Company, Inc.

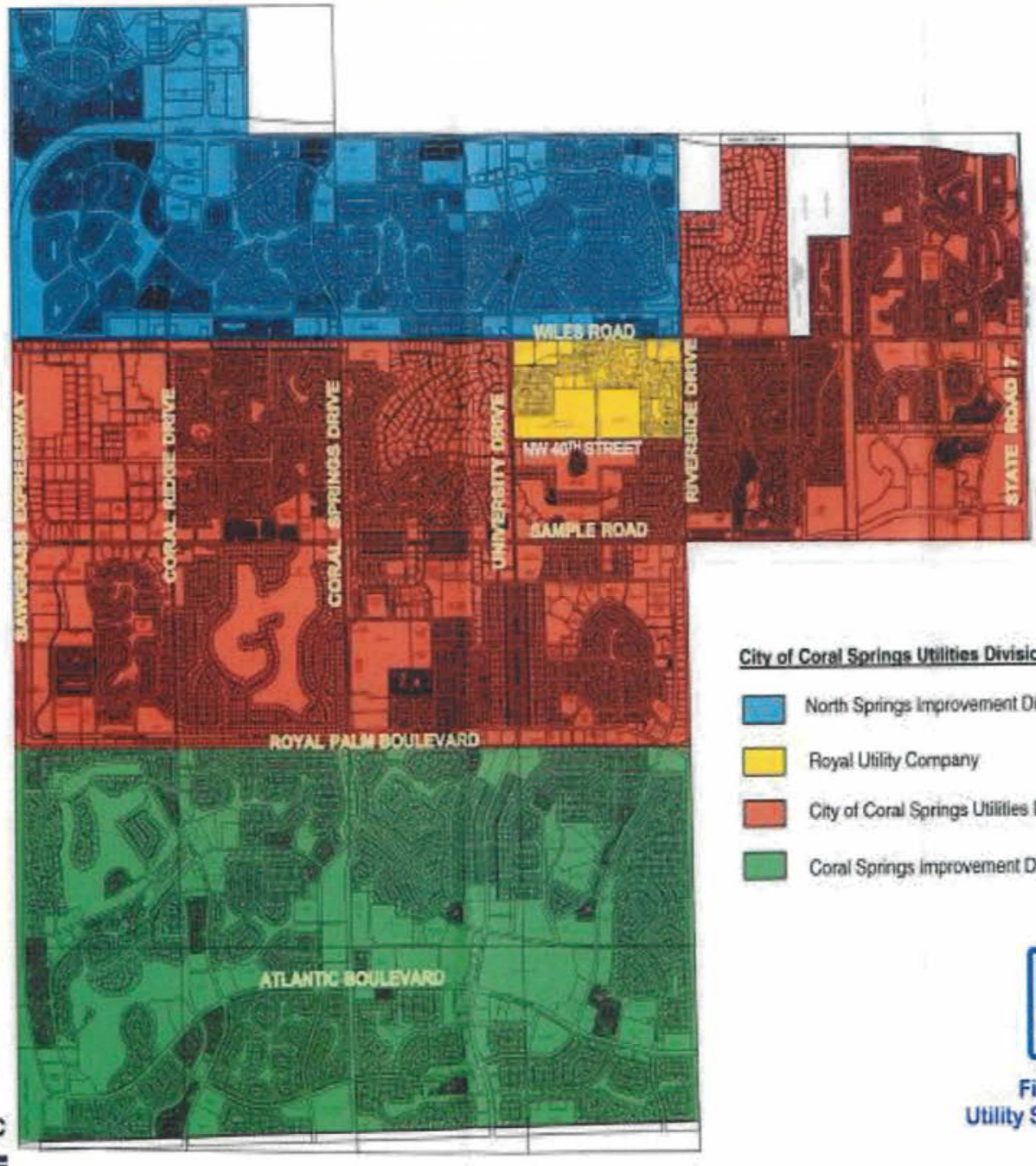
Figure 3-1 shows the location of RU with respect to the other water and wastewater utilities within the City limits of Coral Springs. RU is located south of Wiles Road, east of University Drive, north of Cardinal Road and west of Riverside Drive. It encompasses one half square mile and provides water and wastewater service for the developments within this area. The subdivisions and businesses served by RU include Ramblewood East Condominium, Riverside Square, Carriage Pointe, Royal Eagle Plaza, Coventry and Coral Trace. The land within the service area is virtually built out. RU's land use is broken down as follows:

- Single Family Residential – 414 units
- Multi-Family Residential – 1020 units
- Retail – 340,000 square feet
- Parks and Sensitive Lands – 2
- Commercial Nursery – 1

Ramblewood East is the oldest development within the service area, built in 1974. Riverside Square was built in 1987 followed by Carriage Pointe, Royal Eagle Plaza and Coventry in 1989. Lastly, Coral Trace was constructed in 1990.

Note that because the RU service area is built out none of the necessary capital improvements identified in this report are for the purposes of capacity expansion, or for service to new or anticipated customers.

The recommended renovations recommended in this report are similar in scope and cost to numerous other utilities in South Florida which are the same approximate age as Royal Utility and have performed similar renovations.



Bevin A. Beaudet P.E., LLC

Figure 3-1
Utility Service Areas

Section 4 – Method of Evaluation

This evaluation is based not only on review of records (record drawings, maps, operating permits, operating and maintenance records, consumptive use permits, as well as the long-term bulk wastewater agreement with Broward County), but also a physical inspection of the all of the RU facilities. The conclusions based on this detailed physical evaluation are backed up by photographs of the water treatment plant, photographs of many of the manholes within the collection system, photographs of the four lift stations and review of videography reports of the collection system within Ramblewood East. Videography of Raw Water Wells #1 and #2 was also conducted. All of the photos and videos can be provided to a reviewer of this report upon request. Cost estimates provided in the report come from historical cost data for similar renovations as well as directly from manufacturer's representatives and contractors who personally inspected the facilities.

Section 5- Existing Water Facilities

Royal Utility's water system is comprised of the following major facilities: raw water wells and raw water transmission pipeline, water treatment plant, potable water transmission and distribution system, water services, fire hydrants and valves. Table 5-1 presents a tabulation of the Water System Guidelines for Average Service Lives of typical equipment comprising a drinking water system, derived from FAC 25-30.140 (2) (a). This table will be referred to in comparing the age of Royal Utility's equipment to the guidelines in the rule for each unit process or major piece of equipment recommended to be renovated or replaced.

Table 5-1
Water System Guidelines
Average Service Lives
Small (Class C) Utility (1)

Description	ASL (Years)	Royal Utility Equipment Age
Drilled & Cased Well	27	41
Water Treatment Plant	27	41
High Service Pumping Equipment	17	41
Power Generation Equipment	17	41
Water Treatment Equipment	17	41

(1) Source FAC 25.30.140

There are two existing emergency interconnects between RU and the City of Coral Springs Utility. These interconnects are shown in Figure 5-1. One is in the Northwest corner of the RU system and one in the Southeast section of the system. These interconnects are capable of supplying RU with all of its water needs during construction of capital improvements to the water system. RU has an emergency interconnect agreement with the City of Coral Springs that would allow the temporary bulk service during the construction period. The cost of temporary

service to RU, while higher than RU's production costs, would not be substantial enough to cause financial difficulties to RU and these additional costs could be capitalized as a component of the recommended capital improvements.

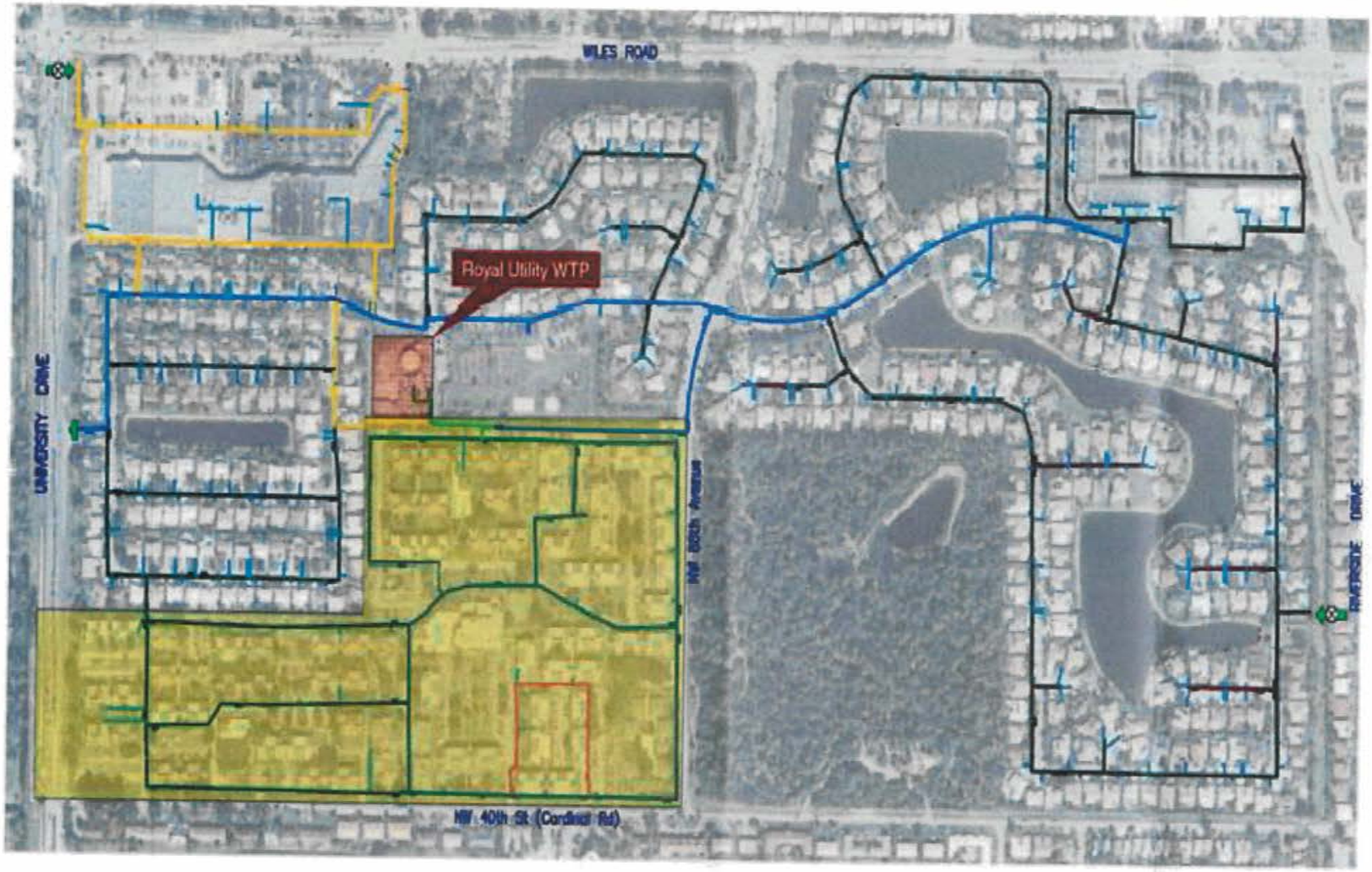
5-1 Water Supply Wells

Royal Utility's water supply is comprised of three surficial water wells which extract groundwater from the Biscayne Aquifer, from 127-140 feet below the surface. RU has three wells each with a design capacity of 350 GPM, all of which are located in Ramblewood East. The total capacity of the raw water supply wells is rated at 1.5 MGD. Two of the three water supply wells operate for two consecutive days and are rested on the third day. The raw water wells are equipped with vertical turbine pumps which are capable of delivering 350 GPM. With two of the raw water wells operating daily, RU can meet the water treatment plant permitted capacity of 1.0 MGD (700 GPM) with one redundant well as required in its permit. Table 5-2, Description of Raw Water Wells, lists pertinent well information.

Each water supply well is housed within an 8' x 12' concrete block well house. Each well house is equipped with reinforced concrete flooring, full louver metal doors, and two louvered wall blocks for ventilation. The well piping for each of the water supply wells includes an air release valve, a check valve and a 5-inch propeller type raw water meter for measuring flow. The wells are also equipped with air operated water level indicators suitable to permit the operator to determine the depth from ground surface to the water level in the well.

Table 5-2
Description of Raw Water Wells

Well No.	1	2	3
Casing Diameter (Inches)	8	12	12
Total Depth	140	180	180
Ceased Depth	128	140	132
Pump Manufacturer	Goulds	Goulds	Peerless
Year Well Installed	1975	1975	1975
Pump Type	Vertical Turbine	Vertical Turbine	Vertical Turbine
Pump Capacity	350 GPM at 71' TDH	350 GPM at 64' TDH	350 GPM at 64' TDH
Year Pump Installed	2015	2016	1975
Meter Type	5" Propeller	5" Propeller	5" Propeller



Pipe Legend:

Material and Size	Ramblewood (LF)	Remaining Area (LF)
6" ACP	1,110	0
6" PVC	0	2,432
8" ACP	6,988	0
8" PVC	2,980	19,914
10" PVC	0	4,839
12" PVC	0	6,368
16" DIP	0	573

Water Services

Ramblewood East

Lateral Type	Ramblewood (LF)	Remaining Area (LF)
Single Laterals	47	38
Double Laterals	0	135
Quad Laterals	0	146
Penta Laterals	0	1

Bevin A. Beaudet, P.E., LLC

Royal Utility Company

Figure 5-1
Water Mains & Services
& System Interconnects

Pipe Legend:

- Raw Water Main
- Raw Water Well
- Ramblewood East

Bevin A. Beaudet, P.E., LLC

Royal Utility Company
Figure 5-2
Raw Water Mains & Wells

5-2 Condition of RU's Existing Wells

RU's three wells are over 40 years old and well beyond their Average Service Life as shown in Figure 5-1. A detailed evaluation was conducted to determine more definitively the condition of the three wells and their remaining expected life, if any. Pumping and other operational records were reviewed and current operational status was determined. Wells #1 and #2 have failed within the past year due to corrosion of their pump turbine bowls and drive columns. These have been replaced as indicated in Table 5-2. After the pumps and drive columns were removed and the well casings cleaned, they were air-jet pumped and then video inspected in both a static and dynamic condition. Both wells demonstrated longitudinal cracks in the casing and areas of corrosion. Under dynamic testing conditions, there was no penetration of the groundwater anywhere in the casings, however the condition is such that penetration of the casings is only a matter of a short time, a few years at most, which would cause catastrophic failure to produce sufficient water to meet RU's demand. All three wells need to be re-drilled and re-cased in order to insure continued and reliable service.

5-3 Raw Water Mains

Six to eight-inch raw water mains are utilized to deliver raw water to the water treatment plant. Table 5-3 provides details of RU's raw water mains. Figure 5-2 illustrates the location of the wells and raw water mains.

Table 5-3
Raw Water Mains

Description	Quantity
6" CIP	1,170 Ft
8" CIP	1,983 Ft
10" CIP	186 Ft
12" CIP	95 Ft

5-4 Condition of Raw Water Mains

The raw water mains appear to be in good condition and although they are aged beyond their published Average Service Lives, I see no reason to replace them at this time. There have been no documented raw water main breaks nor are there other operational issues with the raw water mains at this time.

Bevin A. Beaudet, P.E., LLC

Royal Utility Company
Figure 5-2
Raw Water Mains & Wells

5-5 Water Distribution System

Table 5-4 shows the sizes, types and length of each type of water main pipe included in the RU system. Fire hydrant and backflow preventer quantities are also provided in the table. According to RU and verified by random inspection, each meter within the utility, whether commercial, single family home or multi-family master meter is equipped with a backflow preventer, either Reduced Pressure Zone (RPZ) a residential double check valve, or both. This is an important detail as it means that RU is compliant with FDEP's new Backflow Prevention Rule FAC Rule 62.555.360. The fire hydrants in the system have been inspected and maintained annually as required by Broward County Health Department regulations, and system valves are periodically exercised to insure that they are in working order when needed.

Table 5-4
Water Mains, Fire Hydrants, and Backflow Preventers

Description	Ramblewood East	Remaining Area
6" ACP	1,120 Ft	0
6" PVC	0	3,433 Ft
8" ACP	6,988 Ft	0
8" PVC	2,980 Ft	19,914 Ft
10" PVC	0	4,839 Ft
12" PVC	0	6,368 Ft
16" PVC	0	573 Ft
Fire Hydrants	46	448
Backflow Preventers	47	600

Table 5-5 presents a list of water service connections within RU. Each service is equipped with a manual read water meter. The original water services in Ramblewood East were galvanized iron pipe. These have all been replaced with polyethylene pipe and are in good condition. The remaining services are of polyethylene pipe.

Table 5-5
Water Services

Lateral Type	Ramblewood East	Remaining Area
Single Lateral	47	36
Double Lateral	0	135
Quad Lateral	0	146
Penta Lateral	0	1

5-6 Condition of Water Distribution

The water mains in the RU system are in good condition. All the Ramblewood East galvanized services have been replaced with polyethylene pipe except for one service, which poses a difficult conflict with an electrical transformer. There have been only two distribution and two transmission line breaks in the PVC AWWA C900 System over the past 5 years. While the water distribution system as a whole is at or near its Average Service Life, especially in the Ramblewood East service area, there has been no record of excessive line breaks. Only one documented line break of Ramblewood East pipe has been documented. This pipe was located adjacent to a drainage conflict structure and was valved off pending replacement of the structure. While there is a little more than 8000 feet of asbestos cement pipe in Ramblewood East, no replacement of this pipe is currently recommended. Routine sampling of water from the asbestos cement pipe has detected no asbestos filaments and therefore has not exceeded FDEP's Maximum Contaminant Level (MCL). The water quality results strongly suggest that there is no internal corrosion of the installed ACP and further support the documented lack of line breaks. Internal corrosion and/or external line breaks are the two most common reasons for the presence of asbestos fibers in water quality from ACP.

5-7 Water Treatment Plant

The water treatment plant was constructed in 1975. The plant uses a typical lime softening treatment process and consists of the following process units:

- **AERATOR:** Westinghouse Infilco #52B Multicone aerator rated at 1400 GPM. The unit includes a steel collecting pan, 12" raw water piping from the inside of the softening unit to the aerator and air separation chamber and all connecting piping.
- **LIME SLAKER:** Wallace and Tiernan 500 lbs./hour located inside a field erected steel lime silo with 50 tons storage for dry quicklime.
- **UPFLOW SOFTENING CLARIFIER UNIT:** Westinghouse Infilco Accelator 41.5' in diameter and 14.75' side wall depth. The Accelator is currently operated at 700 GPM at a rise rate of 0.58 GPM/square foot and a detention time of 144 minutes. Its ultimate capacity is 1400 GPM with a rise rate of 1.15 GPM/square foot and a detention time of 72 minutes. The Accelator is equipped with the original Reeves gear drive.
- **GRAVITY FILTERS:** Westinghouse Infilco 3-bay package gravity filter, each filter bay being 8' x 12' for a total of 288 square feet for a maximum capacity of 700 GPM based on a filtration rate of 2.43 GPM/square foot.
- **BACK-UP POWER GENERATOR:** 250 KW Delco AC Generator with Detroit Diesel engine.
- **FINISHED WATER PUMPS:** The plant is equipped with two constant speed high service pumps (HSP). These are Peerless vertical, motor driven water lubricated turbine pumps over the clearwell. HSP #1 has a 6" discharge and is rated at 500 GPM at 160' of Total Dynamic Head (TDH). HSP #2 is a similar pump with an 8" discharge, and a capacity of 1000 GPM at 160 TDH. The motors to these pumps

are US Motors 25 and 50 horsepower (HP) respectively. There is a Backwash/Transfer pump as well located over the clearwell. This pump has a 10" discharge and 1500 GPM capacity at 40' of TDH.

- **STORAGE:** The plant is built over an 80,000 gallon concrete clearwell and also has a 0.5 MG CROM prestressed concrete ground storage tank. There is also a 5,000 gallon hydropneumatic tank run installed to regulate system pressure.

Figure 5-3 shows an aerial photographic view of the water treatment plant with a legend identifying the above mentioned unit processes.

5-8 Condition of the Water Treatment Plant

As previously discussed, the water treatment plant consists of mostly original equipment and is over 40 years old, well over the Water System Guidelines shown in Table 5-1. Physical inspection revealed significant condition problems including:

- **AERATOR:** The Westinghouse Infilco Multicone aerator is original to the plant, although it has been rebuilt several times over the past ten years. The purpose of this unit is to remove corrosive and harmful gases, such as hydrogen sulfide, and also volatile organic pre-cursors of chlorine by-products prior to treatment in the softening unit. The condition of the aerator is poor, with corrosion and structural misalignment of many of the cones. The structural soundness of the unit, which is perched above the clarifier, is also questionable. The aeration system must be replaced in order to assure reliable long-term operation.
- **LIME SLAKER:** The original Wallace and Tiernan lime slaker is over 40 years old, and although it has been rebuilt several times it is highly unreliable, requires constant maintenance and in my opinion subject to breakdown at any time without notice. Failure of the lime slaker would prevent the operation of the softening/coagulation microbial barrier required by the plant's permit and jeopardize the health and safety of its customers. The lime slaker must be replaced in order to assure reliable long-term operation.
- **UPFLOW SOFTENING CLARIFIER UNIT:** The upflow softening clarifier unit, also called a solids contact unit, Infilco Accelator, is also over 40 years old and while it is currently operational, there are significant problems that could jeopardize its near and long-term operation. These include misalignment of collector troughs and weirs, spot corrosion of the unit itself as well as the internal parts, and the age and poor condition of the original Reeves gear drive that turns the sludge removal mechanism. Parts are no longer available for the gear drive as it is an obsolete piece of equipment. The solids contact unit is the core of the multiple barrier softening/coagulation system that the plant is designed and permitted for. Potential structural failure or leaks, partial collapse of the troughs and weirs or failure of the gear drive all can jeopardize proper operation of the system and cause the plant to be out of compliance with its water quality compliance requirements as proscribed by FAC 62-550. Even a minor operational failure of the solids contact unit can cause excess turbidity in the water to the filters and thus jeopardize proper filtration and finished water

quality as well. The solids contact system must be renovated and rebuilt in order to assure reliable long-term operation.

- **GRAVITY FILTERS:** The three-bay Westinghouse/Infilco gravity filter is also original to the plant and is in very poor condition. While it is currently operational, most of the operating valves and actuators have failed and this requires the filters to be manually operated from the master backwash valve, a difficult and questionable operation from a health and safety perspective. Failure of the sensitive manual default operation can result in either a failure to completely backwash the filters themselves or can blow the media over the discharge troughs resulting in media loss and filter inefficiency. The filter system must be renovated and rebuilt in order to assure reliable long-term operation.
- **BACK-UP POWER GENERATOR:** The base generator unit is original to the plant. The engine is quite old but it is likely to have been replaced at least 20 years ago. The current owners do not have a record of the replacement date. While the unit is kept in operating condition and exercised every week, in my opinion the very age of the system puts its service reliability into question. Failure of the back-up power generator will cause the plant to cease operation during extended power failures and during storm or other severe weather events. Of course this would result in potentially long-term service disruption to the approximately 4,000 people who rely on the water from the plant. Furthermore, the current Automatic Transfer Switch (ATS) is obsolete and not up to current electrical code and needs to be replaced. This back-up power system must be replaced in order to assure reliable long-term operation. It is well beyond its useful service life.
- **FINISHED WATER PUMPS:** The two high service pumps and the backwash/transfer pump are original to the plant and were installed in 1975. The 25 and 50 HP US Motors electric motors for the HSP's are also original to the plant. The US Motors 20 HP pump that serves the backwash/transfer pump has been replaced, but the US Motors 20 HP electric motor has been changed out at some unknown date in the past, many years ago. This entire pumping system is well over the Average Service Life as shown in Table 5-1 and is in very poor condition. Any of the pumps and/or motors could fail at any time, resulting in severe pressure drop of water in the system, which puts the health and safety of the customers in jeopardy for both microbiological contamination and firefighting reasons. This system must be replaced in order to assure reliable long-term operation.
- **STORAGE:** The finished water storage units, the clearwell and the above ground prestressed concrete have been structurally and operationally inspected, repaired and coated as necessary every five years as proscribed by the plant's permit. Based on inspection reports (the last inspection was completed two years ago), the storage units are in good condition and no corrective action is necessary for long-term operation of the plant. The hydropneumatic tank was replaced in 2009 and is in good condition.

5-9 Additional Recommended Treatment Process

The Royal Utility Water Treatment Plant had been using free chlorine residual until June of 2015 when the disinfection method was changed to chloramination through the addition of ammonia. A new ammoniation system was constructed for this purpose. This change was necessary for the utility to meet the Maximum Contaminant Levels for Total Trihalomethanes (TTHM) and Halo Acetic Acids (HAA5) required by FAC 62-550.310. Since the change to chloramination there has been only one quality reporting period showing the results of the change in disinfection process – Stage 2 Quarterly Monitoring Period Q4 2015. The data in this report show that compliance is being achieved for both parameters, however the compliance margin is not as large as could be considered comfortable. The QTR 4 monitoring shows that the Long Range Annual Average (LRAA) level for THM is 70.8 mg/l (MCL is 80 mg/l) and the HAA5 LRAA is 37.2 mg/l (MCL is 60 mg/l). Maintaining these levels of compliance involves significant and complex operational methods with regard to algae control in the Accelator and filters as well as significant system line flushing. The amount of treated water wasted through line flushing is estimated at nearly 5 percent of production. The problem of marginal compliance is exacerbated in summer months when treated water temperatures go from 24 degrees F to 29 degrees F. The other issue is the unregulated organic contaminants that are continually being evaluated by the US Environmental Protection Agency (USEPA), including pharmaceuticals and other chlorinated by-products. It is highly likely that more stringent regulations are coming that will render the current treatment process insufficient for compliance.

For these reasons: improving compliance margins for THM and HAA5, reducing water wasted by flushing, reducing regulated synthetic organic contaminants and for compliance with anticipated new regulations currently being evaluated, it is my recommendation that an additional treatment process unit be installed at the water treatment plant. The process recommended is Anionic Exchange. This process is installed at many South Florida plants that use the same groundwater from the Biscayne aquifer with great success. Similar systems in South Florida have seen reductions in Total Organic Carbon (TOC) of nearly 70 percent. This TOC reduction translates directly into reduction of pre-cursors of disinfection by-products substantially improving THM and HAA5 compliance levels. The system can also greatly reduce other objectionable organic contaminants such as synthetic organic chemicals and pharmaceuticals. Reduction of TTHM precursors in the distribution system also greatly reduces the amount of water needed for system flushing which is a major water conservation benefit. Another significant benefit is that anionic exchange also improves the aesthetic quality of the water, which to the customer is its most visible benefit. The Anionic Exchange system would be located between the gravity filters and storage/high service pumping, as shown in Figure 5-4. Details of the recommended Anionic Exchange system are detailed in Appendix G.

A further recommendation is that during renovation of the finished water pumps and gravity filter system, minor changes made to the current yard piping which allows for direct pumping of finished water from the clearwell immediately after filtration. This condition represents potential short circuiting of treated water so that the full value of

disinfection contact time is not always realized. The additional contact time of re-routing finished water pumping after additional storage (which is already in place) may allow the plant to achieve a 4-log virus removal condition, greatly improving drinking water safety.

5-10 Recommendation for a Supervisory Control and Data Acquisition (SCADA) System

The existing process control system in use at Royal Utility is 40-years old and totally obsolete. The system relies primarily on analog signals and is unable to view the entire water treatment process as a whole or to view and adjust the operating condition of the three wells and four lift stations. The current process control system, about 10 generations behind current technology, is not only unable to monitor many key treatment process units, but is totally incapable of performing immediate operational changes key to maintaining public health and safety. RU is unable to remotely turn lift station pumps or wells on or off, to backwash filters or to vary chemical feeds to match flow demand and water quality requirements. A modern SCADA system is indispensable for improving operating conditions and is a highly important component of a modern plant for consistently maintaining water quality standards, avoiding sanitary sewer overflows (SSO's) or overpumping shallow Biscayne Aquifer supply wells. An in-plant SCADA system allows for real-time monitoring of hydraulic and water quality conditions throughout the treatment process, water distribution system and wastewater collection system, providing the ability to make immediate changes to the system's operation which greatly improves operational safety margins. Modest upgrade of the RU SCADA system is strongly recommended as a critical component of the renovation of the facilities identified above. It will be much more efficient to install a new SCADA system during construction of the other recommended renovations, and therefore SCADA system upgrades are included in the recommended improvements to RU and the overall cost estimate.

SECTION 6 – EXISTING WASTEWATER FACILITIES

The Royal Utility wastewater system is comprised of approximately 35,000 feet of gravity collection piping. Three area lift stations pump the collected wastewater to a master lift station through approximately 6,700 feet of force mains. The master lift station pumps the wastewater through a master meter located at NW 88th Avenue to a Broward County force main and thence to the Broward County North Regional Wastewater Plant on Powerline and Copans Roads. Royal Utility has a Large Users Agreement with Broward County which specifies the amount of wastewater that RU can send to the Broward County plant. Currently, RU is allowed to send an average daily flow of 0.45 MGD and a maximum daily flow of 0.91 MGD. This allocation meets RU's wastewater demand.

Table 6-1 presents a tabulation of the Wastewater System Guidelines for Average Service Lives of typical equipment comprising a domestic wastewater system, derived from FAC 25-30.140 (2) (a). This table will be referred to in comparing the age of Royal Utility's facilities to the guidelines in the rule for each process or major piece of equipment recommended to be renovated or replaced.

Table 6-1
Wastewater System Guidelines
Average Service Lives
Small (Class C) Utility (1)

Description	ASL (Years)	Royal Utility Equipment Age (Years)
Collection System –Masonry	27	41
Life Stations	22	16-41
Manholes	27	16-41
Pumping Equipment	15	1-28

(1) Source FAC 25.30.140

6-1 Wastewater Collection System

Table 6-2 provides details on the type and total length of installed gravity sewer pipe, as well as installed manholes and laterals. Figure 6-1 depicts a map of the gravity sewer system along with laterals and manholes.

Table 6-2
Gravity Sewer System

Description	Ramblewood East	Remaining Area
8" PVC	1,141 Ft	26,308 Ft
8" VCP	7,135 Ft	0
12" CIP	31 Ft	0
Manholes	46	113
Single Lateral	26	103
Double Lateral	0	184

Pipe Legend:

- Gravity Sewer
- Sanitary Laterals
- Manholes
- Ramblewood East

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Figure 6-1
Gravity Sewer System
Laterals & Manholes

6-2 Lift Stations

Table 6-3 provides details on the three area lift stations as well as the master lift station.

Table 6-3
Lift Stations

Name	1-Master Dual Wet Well	2 Ramblewood East	3 Coventry	4 Carriage Pointe
Design Flow gpm	350	260	235	200
TDH (Feet)	36	29	16	30
Horsepower	3	20	2	5
Year Installed	1984 (1)	1974 (2)	1988 (3)	1986 (4)
Number of Pumps	4	2	2	2

1- Two New 7.5 HP pumps installed in 2015
2- Pumps rehabilitated in 2013
3- Wet well upgraded and new pumps/valves installed in 1988
4- Station rehabilitation planned for Q1 2016

6-3 Force Mains

Table 6-4 gives a description of the type of pipe and length of the wastewater force mains within RU's service area. Figure 6-2 depicts a map of the lift station and force mains.

Table 6-4
Force Mains

Description	Ramblewood East	Remaining Area
6" DIP	1,100 Ft	5,600 Ft

Legend:

- DIP Force Mains
- Lift Stations
- Master Meter
- Ramblewood East

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Figure 6-2

Lift Stations and Force Mains

6-4 Condition of the Wastewater Collection and Transmission System

As stated in Section 4, considerable effort was made to inspect the wastewater collection and pumping system in order to determine its condition and develop realistic costs for upgrading the system to an operating standard that will provide reliable long-term service to RU customers. The elements of this inspection included:

- Reviewing all the written reports of the TV inspections on file for the system and selectively reviewing some film as well.
- Opening and visually inspecting 108 of the system's 159 manholes, including 45 of the 48 manholes in Ramblewood East. The manholes in the newer parts of the system were selectively inspected to emphasize those which would be most probable to have problems. These would include manholes with intersections, turns, drops or those nearest the lift station wet wells in case of sulfide damage.
- Reviewing operational and repair and maintenance records of each of the lift stations and visually inspecting them.
- Engaging two different contractors to inspect and give a repair plan and cost for the master lift station.

The results of this inspection revealed the following information:

- It is clear that the vitrified clay pipe gravity sewer lines in Ramblewood East need to be relined. The TV inspection as well as visual inspection results at adjacent manholes during rainfall conditions revealed high levels of infiltration. These VC pipes have been TV inspected and chemically grouted three times over the last 25 years. The Vitrified Clay pipes are well beyond their Average Service Life and their performance clearly indicate violation of general infiltration and inflow requirements as defined in FAC 62-604.300. During heavy rainfall, lines subject to infiltration, such as those in Ramblewood East, run with relatively clear water, while the remaining, tighter lines within the collection system continue to display water typical of the color of fresh sewage.
- The gravity sewer lines in the rest of the system are in good condition, acceptably tight, and do not need any repair or replacement work. This conclusion was supported by visual inspection of flow in the manholes in the newer areas of the system during high rainfall conditions.
- The system's manholes are generally in good condition. The Ramblewood East manholes need the most work, however the repairs needed are mostly the re-mudding and resetting of chimneys, rings and covers to stop inflow and infiltration. The walls and piping of these manholes are in reasonably good condition. While they may need some cleaning they do not need significant structural repairs and only one or two of these manholes need to be recoated. The manholes in the newer areas of the system are in much better condition. A few of them need some minor re-mudding at the chimneys and/or rings. Some need physical readjustment of the rings due to road construction following installation of the manhole.

- The three area lift stations are structurally sound and do not need to be relined or recoated. The pumps in each of these lift stations have been maintained by a private company over the years and the pumps have been continuously repaired, rebuilt or replaced with new pumps as needed. Similarly, control panels have been continuously repaired and are in reasonably good condition.
- The master lift station does show signs of corrosion which has impacted wall thickness and is beginning to expose the reinforcing iron. During this review, RU's contractor replaced two pumps in the master station with new 7.5 HP submersibles in the east wet well. The master lift station needs to be repaired structurally to restore the long-term integrity of the structure.

SECTION 7 – ESTIMATED COSTS OF RECOMMENDED CAPITAL IMPROVEMENTS

The estimated costs for the capital improvements recommended above are shown in Table 7-1. The cost is shown in 2016 dollars. For cost items 1-4, the estimate includes both equipment, materials and construction labor. These costs are based on recent contract costs for similar repairs at other South Florida utilities. The cost for items 5-11 (water treatment plant renovations) are for equipment and materials only. These costs are backed by written estimates from manufacturers' representatives who inspected the plant with the engineer in February and March 2016. The construction cost estimate for items 5-11 are separately shown at the bottom of Table 7-1 and are based on a written contractor's estimate coordinated with the engineer and the manufacturers' representatives, who each inspected the plant together in March 2016. Appendices A-H contain detailed information regarding the equipment and construction requirements for items 5-11.

Any significant renovation of an existing plant requires the ability to quickly modify designs in the field due to the numerous unplanned situations that arise much more often than in greenfield construction. For that reason it is my recommendation that the entire project be delivered using a design-build model. This is the model upon which the contractor's estimates are based, and as such contactor mark-ups for equipment, sales tax, engineering, permitting, construction inspection costs and bonds and insurance are all built into the design build contractor's estimate. A construction contingency of 10% is also built into the estimate in Table 7-1.

The total capital cost of bringing Royal Utility up to a condition that will allow replacement of obsolete equipment that has exceeded its useful service life, to continue to reliably meet customer demand and to comply with all current and reasonably projected water quality standards is shown in Table 7-1 to be $4,000,000. This cost is comparable for the renovation, repair and replacement of similar package plant systems throughout South Florida.

Table 7-1
Cost Estimate of Royal Utility Recommended Improvements

Item	Description	Sub Total	Unit	Unit Costs	Extended Price
	Raw Water Supply				
1	Install New Raw Water Supply Well	3	EA	$228,000	$684,200
	Sanitary System				
2	Lining of 8" VCP	7135'	EA	$29.40	$210,000
3	Rehabilitation of Existing Manholes	25	EA	$1600	$40,000
4	Rehabilitation of Master Lift Station	1	EA	$21,000	$21,000
	Water Treatment Plant				
5	New Aerator (Equipment Only)				$37,000
6	New Lime Slaker (Equipment Only)				$130,000
7	Renovate Accelator and Package Filters (Equipment Only)				$315,000
8	SCADA and Controls (Equipment and Programming Services)				$156,000
9	Tonka Anionic Exchange System (Equipment Only)				$708,900
10	New Back-Up Generator (Equipment Only)				$60,000
11	New High Service and Transfer Pumping System (Equipment Only)				$49,500
	Construction Cost Estimate for Installation and Construction of Items 5-11 (Water Treatment Plant)				$1,555,733
	Total Costs of Recommended Improvements				**$3,967,333**
					Use $4,000,000

Assessment of Royal Utility Co. INC, Coral Springs FL.

Bevin A. Beaudet P.E., LLC

April 2016

MOST RECENT VALUATION REPORT CONDUCTED BY ACCOUNTANTS CJNW BASED ON 2008 AUDITED ACCOUNTS

Royal Utility Company
Estimated Value Based on Bonding Capacity
Year Ended December 31, 2008

Line No.			
1	(A)	Based on City of Coral Springs Current Rates	
2		Projected cash available for debt service (Schedule No. 2)	$ 487,954
3		Divide by factor for 1.10 coverage	1.10
4		Cash available for debt service	$ 443,595
5		Value based on 30 year bond, 5.00% interest rate and level annual payments	
6		(See attached amortization schedule)	$ 6,819,142
7	(B)	Based on Royal Utility Company's Rates	
8		Projected cash available for debt service (Schedule No. 4)	$ 570,238
9		Divide by factor for 1.10 coverage	1.10
10		Cash available for debt service	$ 518,398
11		Value based on 30 year bond, 5.00% interest rate and level annual payments	
12		(See attached amortization schedule)	$ 7,969,048