

RECEIVED

JUN 22 2017

Public Service
Commission

**Preliminary Engineering Report
Rowan Water, Inc.
2016 Water System Improvements
January, 2017**

prepared by:



Submitted By:


Bryan K. Lovan, P.E.
Project Engineer



6-15-17

ROWAN WATER, INC.
Preliminary Engineering Report
2016 Water System Improvements

1. PROJECT PLANNING

a. Location

Rowan Water, Inc. (RWI) is a water association that serves the majority of Rowan County, outside the city limits of Morehead, the northern tip of Elliott County, the western tip of Carter County, the northern tip of Morgan County and the southern tip of Fleming County.

This project has multiple activities in various locations in Rowan County. Project mapping showing the proposed locations of all the proposed activities are attached to this Preliminary Engineering Report as **Appendix A**.

b. Environmental Resources Present

The environmental review has just begun for this project. Most of the work proposed will be at existing facilities with the exception of the construction of a new water storage tank, pump station, and the moving of the master meter vault. The one resource that may be impacted is trees. Trees at the proposed storage tank site will need to be cut. Information will be sent to USFWS to determine the impact and what RWI must do to obtain clearance from USFWS. The State Historic Preservation Office is requiring an archaeological survey of the proposed pump station site. It is unknown at this time what if anything will be found as a result of this survey. Because the site is very small, we expect that it will not be a problem getting it cleared by SHPO for construction of the pump station.

c. Population Trends

The 2010 population for Rowan County was 23,333. The Kentucky State Data Center projects the County population to grow continuously over the next thirty years. By 2040 the population is estimated to be 28,982. The projections from the Kentucky State Data Center for the next thirty years are:

2020	2025	2030	2035	2040
24,879	25,809	26,953	28,023	28,982

In 1987 RWI had a customer base of approximately 2,022 customers. The customers have grown to an average of 6,960 today. The majority of the customers are residential

with the balance being commercial customers. Rowan Water has two wholesale customers, Fleming County Water Association and the City of Olive Hill.

d. Community Engagement

Rowan Water, Inc. monthly board meetings are open to the public for open dialogue with the community. This project will also have an advertised public meeting that will encourage participation by the community for feedback on the project. This public meeting will be able to address construction concerns, funding and revenue strategies, and to address the needs of the project for public benefit.

2. EXISTING FACILITIES

a. Location Map

Maps are attached in **Appendix A**.

b. History

RWI was established in 1968. Major expansions and renovations of its system were done in 1991, 1992, 1998, 2001, 2004, 2007, and 2012. RWI purchases 100 percent of its water from the Morehead Utility Plant Board. All expansions and renovations were on its distribution system.

c. Condition of Existing Facilities

The existing 3-C Trail tank is a glass lined standpipe tank that is no longer serviceable due to its height, and its location in the system does not allow it to turnover as often as it should. Due to the demand in this service area most of the water is absorbed by the customers prior to filling the tank. The Frank Johnson, Rock Fork, and Maxey Flats tanks are old and have not had any substantial upgrades in their lifetimes.

RWI had the Frank Johnson, 3-C Trail, and Maxey Flat tanks inspected by Horizon QC in 2014. The reports on the condition of these two tanks are attached as **Appendix B** to this Preliminary Engineering Report. The Rock Fork glass lined tank was inspected by Horizon QC in 2016 and the inspection report is also attached in **Appendix B**.

d. Financial Status of any Existing Facilities

RWI submits annual an audit and PSC annual report to Rural Development and the Kentucky Public Service Commission.

Information regarding current rate structure, O&M cost, and user data will be compiled in the Summary Addendum to the PER.

e. Water/Energy/Waste Audits

RWI has not had a water energy audit completed, but the new pump station will have more efficient pumps and motors that will be designed to reduce the run time, and thus save energy costs. The new variable drives associated with the pumps will also provide slow ramping of outputs as needed thus adding to the reduction in power costs.

3. NEED FOR THE PROJECT

a. Health, Sanitation, and Security

The existing 3-C Trail Tank is 29 years old and has outlived its location in the system. It does not draw down as it should due to a lack of usage in its service area. The pump station that fills this tank provides most of the pressure to the customers prior to the tank. In addition, the existing tank does not have a mixing system nor does it fill from the top; therefore the quality of the water has become a serious issue. The existing tank is a glass lined standpipe however the current builder of these type tanks can't service a standpipe with the height (97') of the 3-C Trail Tank. Based on the issues facing the existing tank, a new elevated storage tank in a strategic location with a mixing system will provide benefits to RWI and their customers.

b. Aging Infrastructure

The Frank Johnson tank is 24 years old, the Rock Fork Tank 29 years old, and the Maxey Flats Tank 37 years old. None of these tanks have had any substantial upgrades in their lifetimes and are in need of spot repairs and sealing to extend the life of the tanks.

c. Reasonable Growth

Rowan Water has seen a 244 percent growth in customers over the past 30 years. With the population projected to continue to increase over the next 30 years, it is reasonable to expect that Rowan Water's customer base will continue to increase.

4. ALTERNATIVES CONSIDERED

The only alternative considered to the elevated storage tank would be the construction of a standpipe tank. The standpipe tank does not allow for the available storage needed as the tank can only operate out of the top 20 percent of its volume before pressures get too low in the higher elevations. To achieve the needed volume the standpipe tank would have to be taller than the tanks are manufactured.

5. SELECTION OF AN ALTERNATIVE

There is only one alternative and that is to construct a new elevated water storage tank and new pump station that will provide the storage required in this portion of the system. This will allow water to be pumped through the tank, instead of the tank floating on the system. This will also allow the tank to turnover with an adequate mixing system, provide necessary pressures, and improve water quality. The Rock Fork, Maxey Flats and Frank Johnson tanks are all in need of improvements to maximize the life of the product. The existing 3-C Trail tank will be removed from service.

6. PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

a. Preliminary Project Design

The existing 3-C Trail glass lined standpipe tank is 29 years old and is not only in need of extensive repairs, but water fills and exits from the bottom of the tank and therefore does not turnover. The manufacturer of the glass lined standpipe tanks currently is not able to service a tank 97' in height, therefore it is imperative that a new elevated tank replace the existing tank. A new 150,000 gallon elevated tank is recommended in a location that will provide the total compliment of storage to the customers, have a mixing system and inlet/outlet pipes that allow for an extensive improvement in water quality. A new pump station will replace the existing 29 year old pump station that is in need of serious repairs, and will be designed to not only provide water to customers before the tank, but will also be able to fill the tank in a shorter period of time. The new pump station will have Variable Drives (VFD) to increase the energy efficiencies of the new pumps and save the owner money in power costs. Two of the three existing tanks (Maxey Flats and Frank Johnson) are welded steel therefore they will be pressure washed, spot primed and repainted. A third tank (Rock Fork) is a glass lined tank, and it will be resealed on the interior and spot sealed as needed on the exterior. Rowan Water, Inc. will also need to replace a limited amount of 8" PVC pipe and install a new master meter vault (connected to the Morehead Utility Plant Board). This is required at this time as the property the master meter vault is currently on has been extensively filled and is virtually inaccessible. The new vault will be placed in a more strategic location for Rowan Water to read and maintain, and the existing water main will be relocated to an elevation that it can access.

b. Project Schedule

1. Secure Letter of Conditions from Rural Development in February of 2017
2. Land Purchases and Easements by February of 2017.
3. Division of Water Submittal by February, 2017
4. Advertise for Bids March, 2017

5. Contract Award/Begin Construction in June, 2017
6. Substantial Completion – October, 2017
7. Final Completion – November, 2017

c. Permit Requirements

1. Kentucky Division of Water Approval
2. Rowan County Fiscal Court – County Road Encroachment permit
3. Kentucky Department of Highways – State Road Encroachment permit

d. Total Project Cost Estimate

The total project cost Estimate is **\$1,579,680**

See attached detailed Engineer's Estimate in **Appendix C.**

e. Annual Operating Budget – All items below will be covered in the Summary Addendum.

- i) **Income**
- ii) **Annual O&M Costs**
- iii) **Debt Repayments**
- iv) **Reserves**

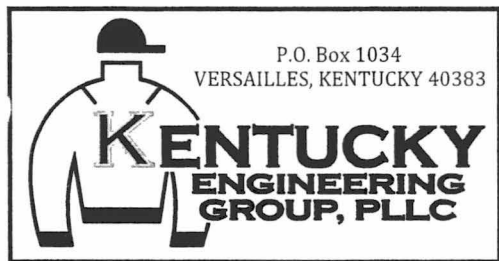
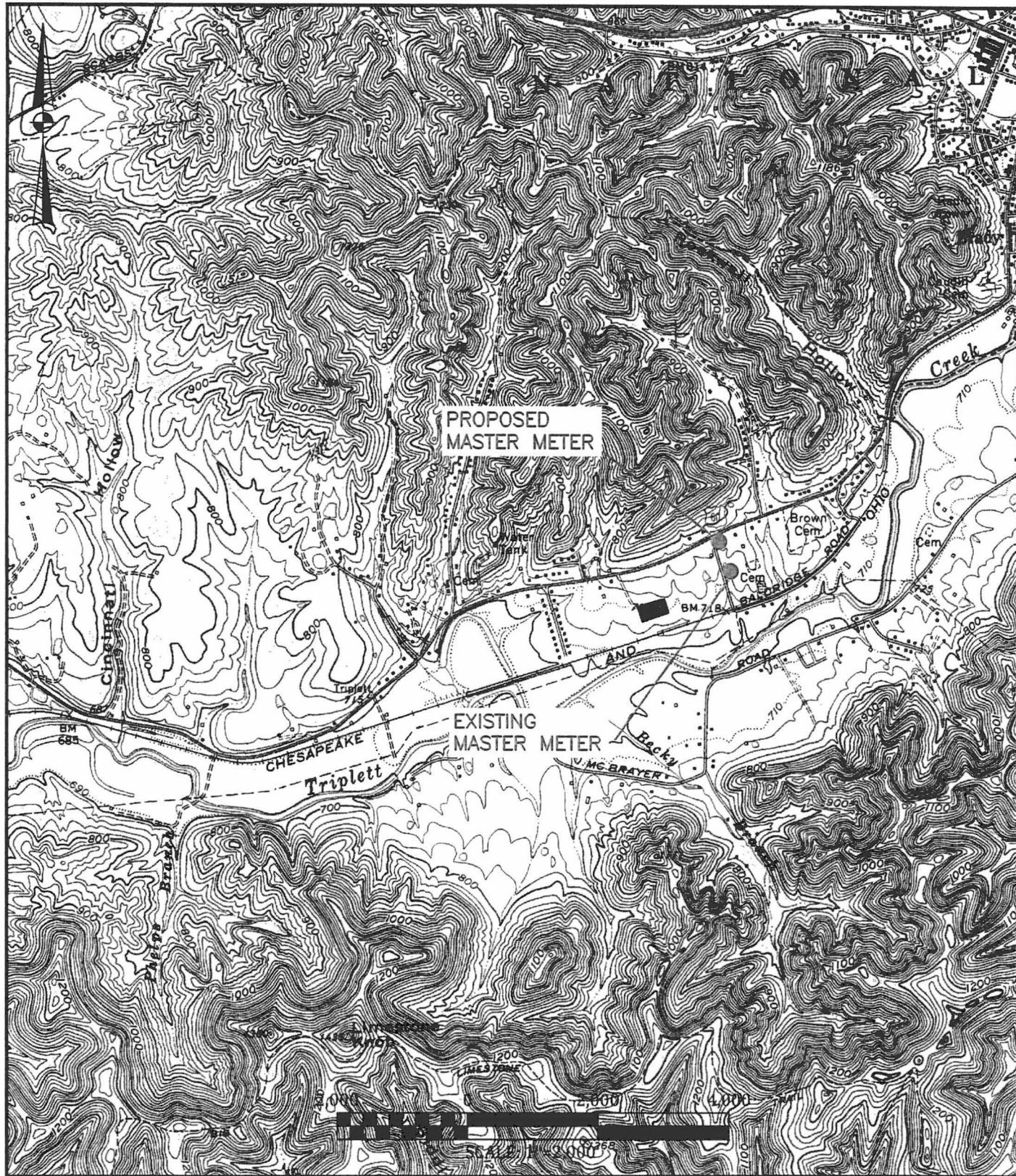
7. CONCLUSIONS AND RECOMMENDATIONS

Rowan Water, Inc. will replace an existing 161,000 aged standpipe tank with a new 150,000 elevated tank, including an interior mixing system. A new pump station with VFD's will replace an aged 30 year old pump station. Three existing tanks will be resealed or repainted increasing their years to the system. A new master meter vault with Morehead Utility Plant Board will replace the aged and nearly inaccessible existing vault.



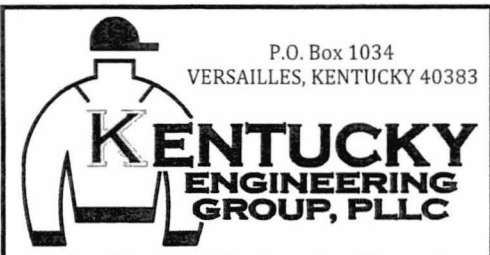
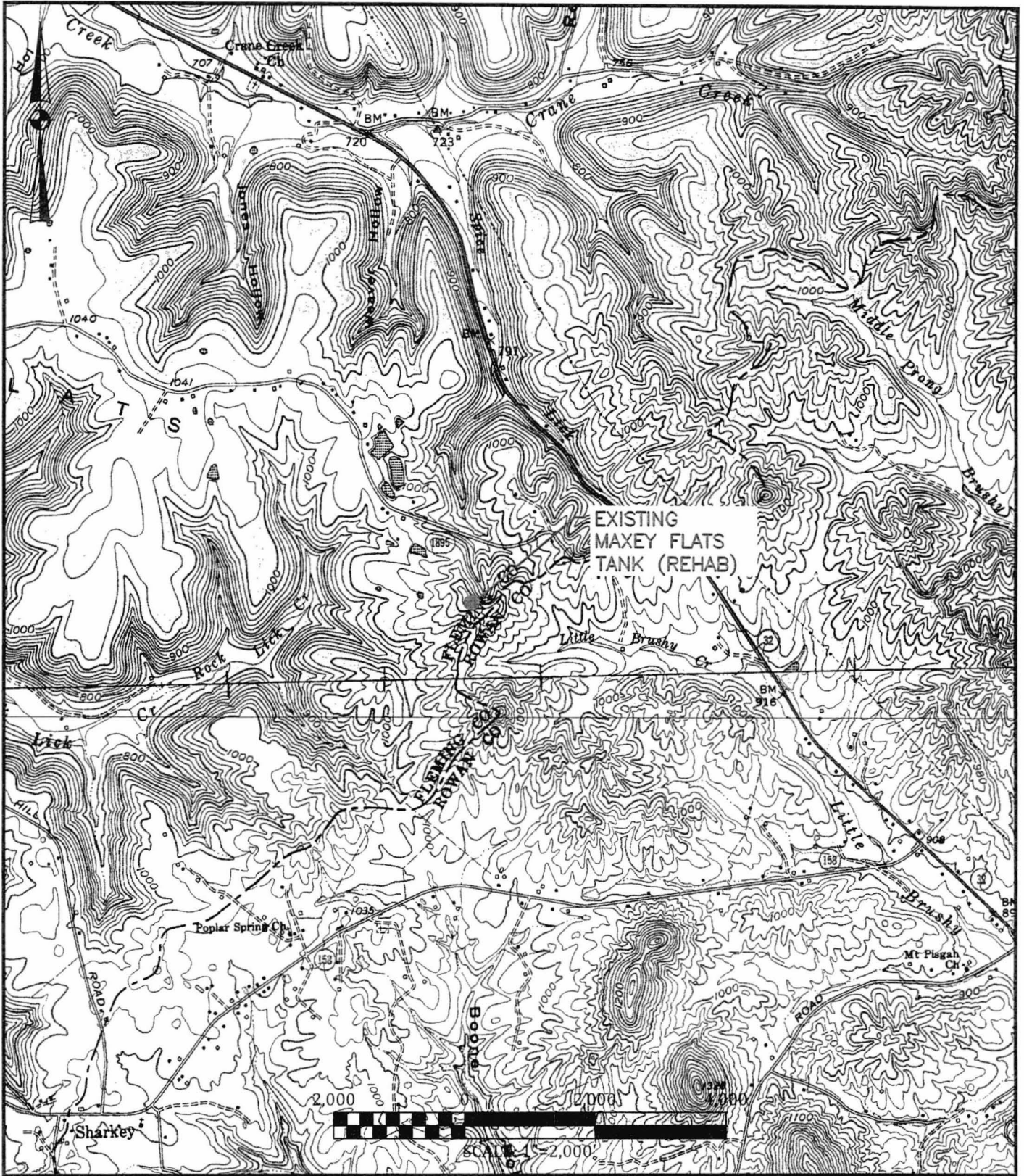
APPENDIX A

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info@kyengr.com
www.kyengr.com



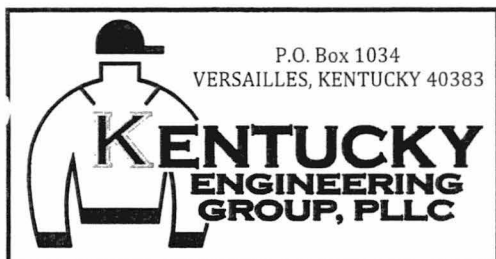
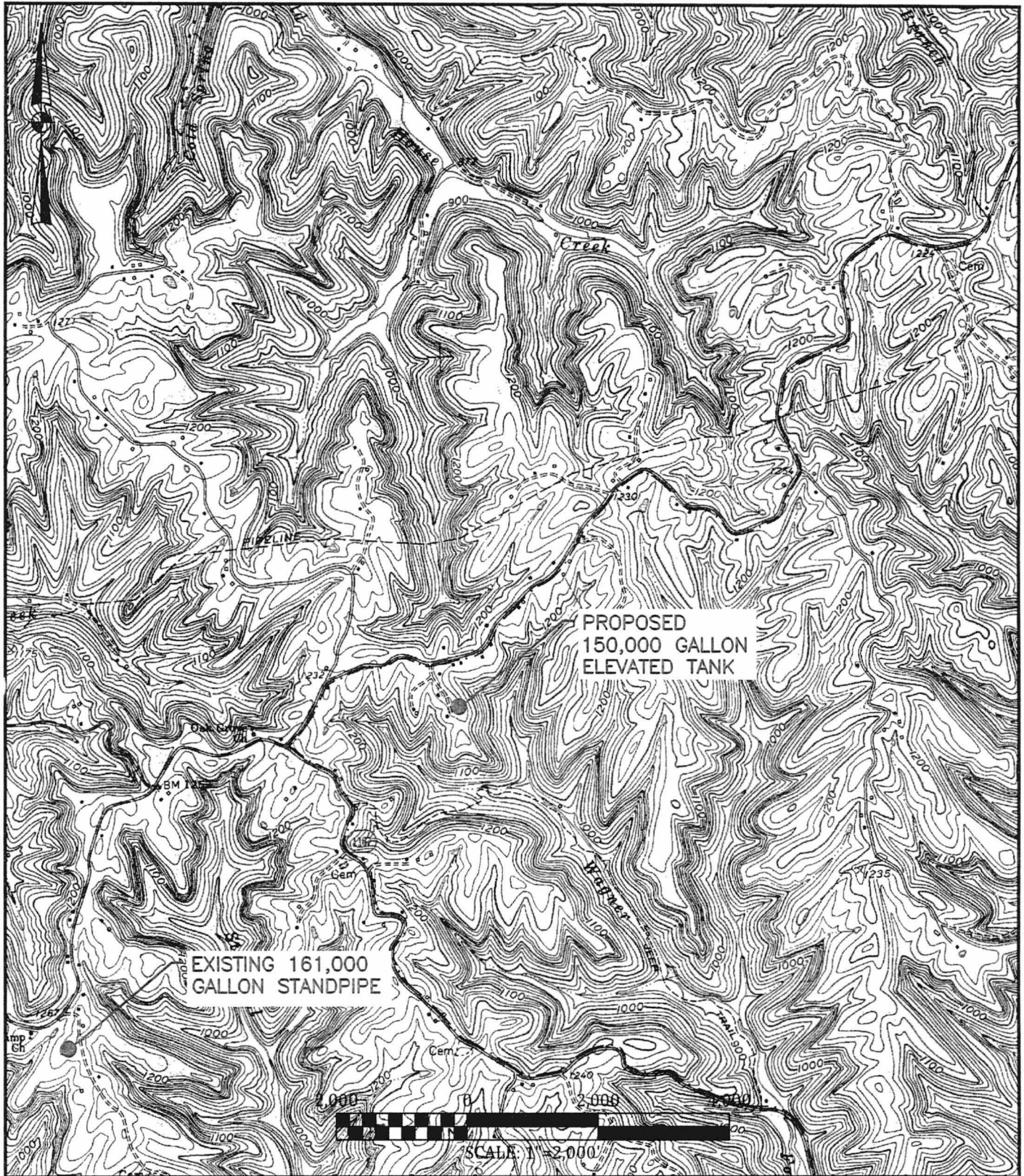
ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	2



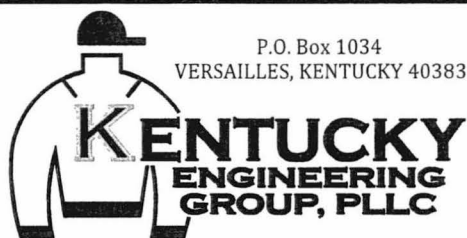
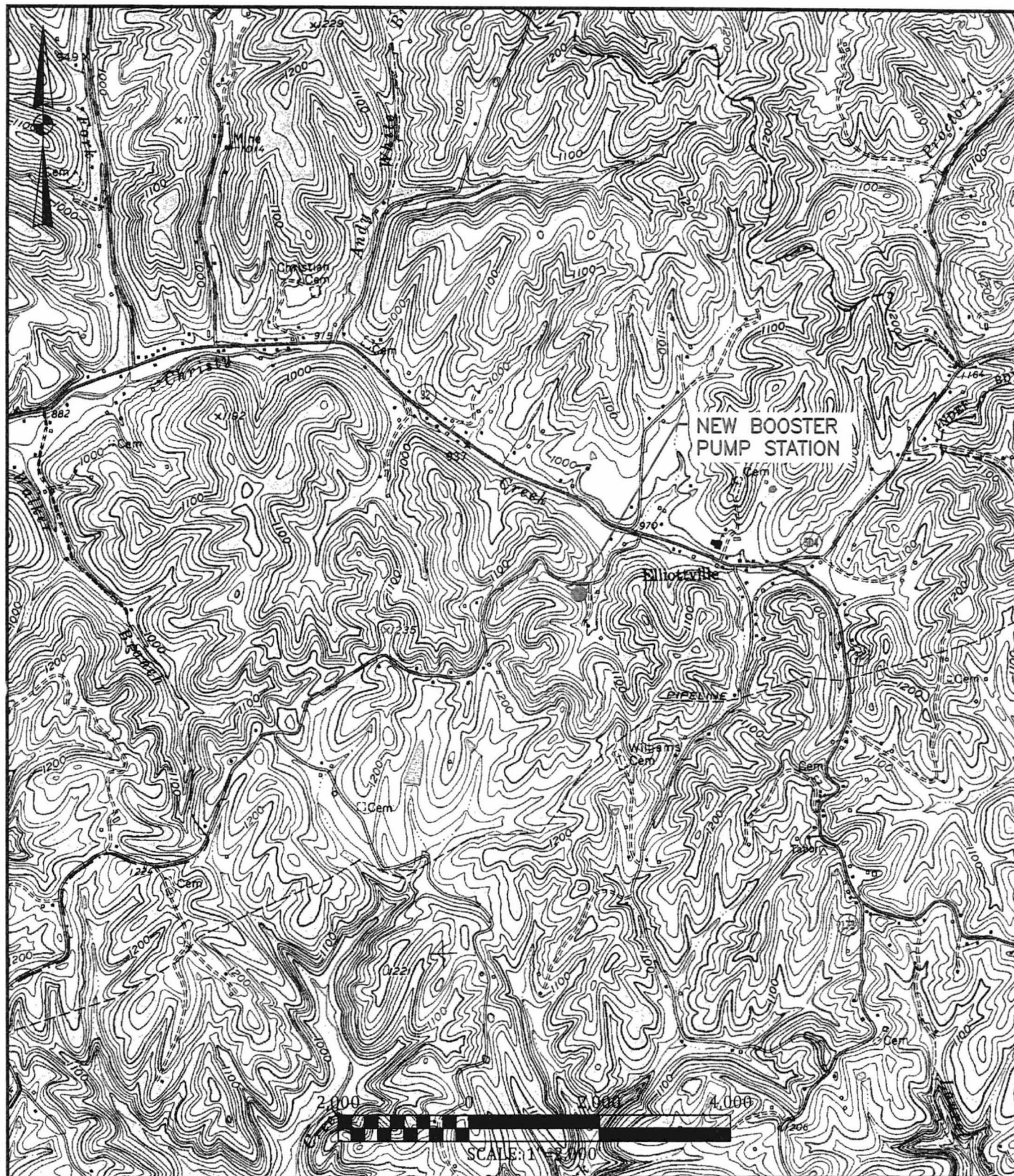
ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	3



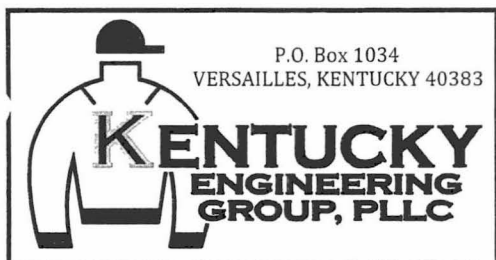
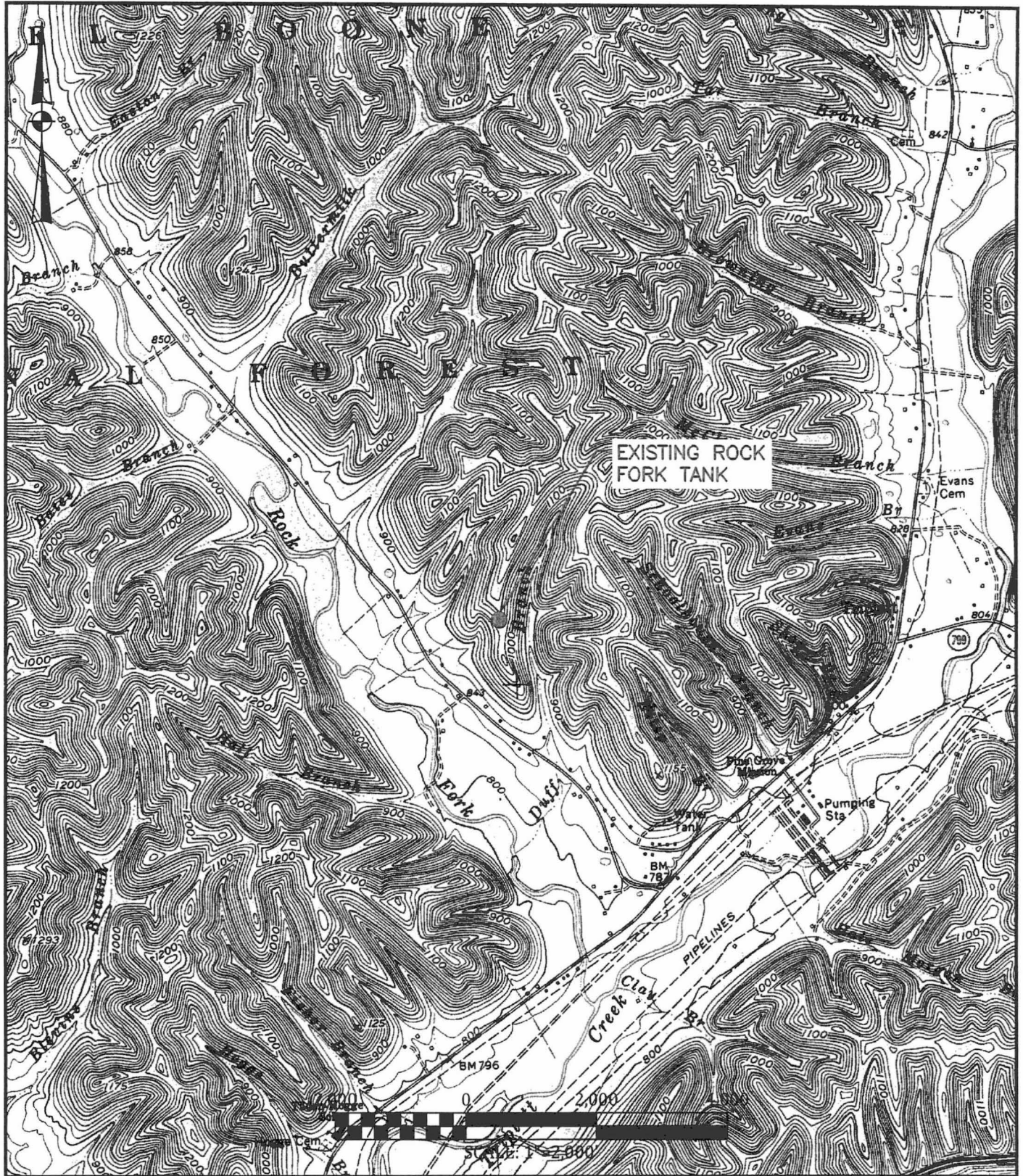
ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	4



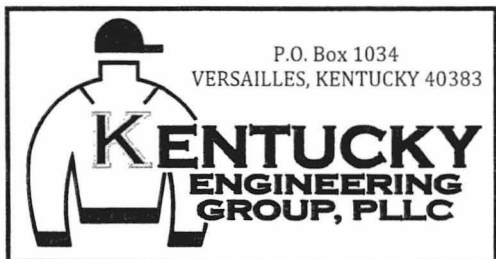
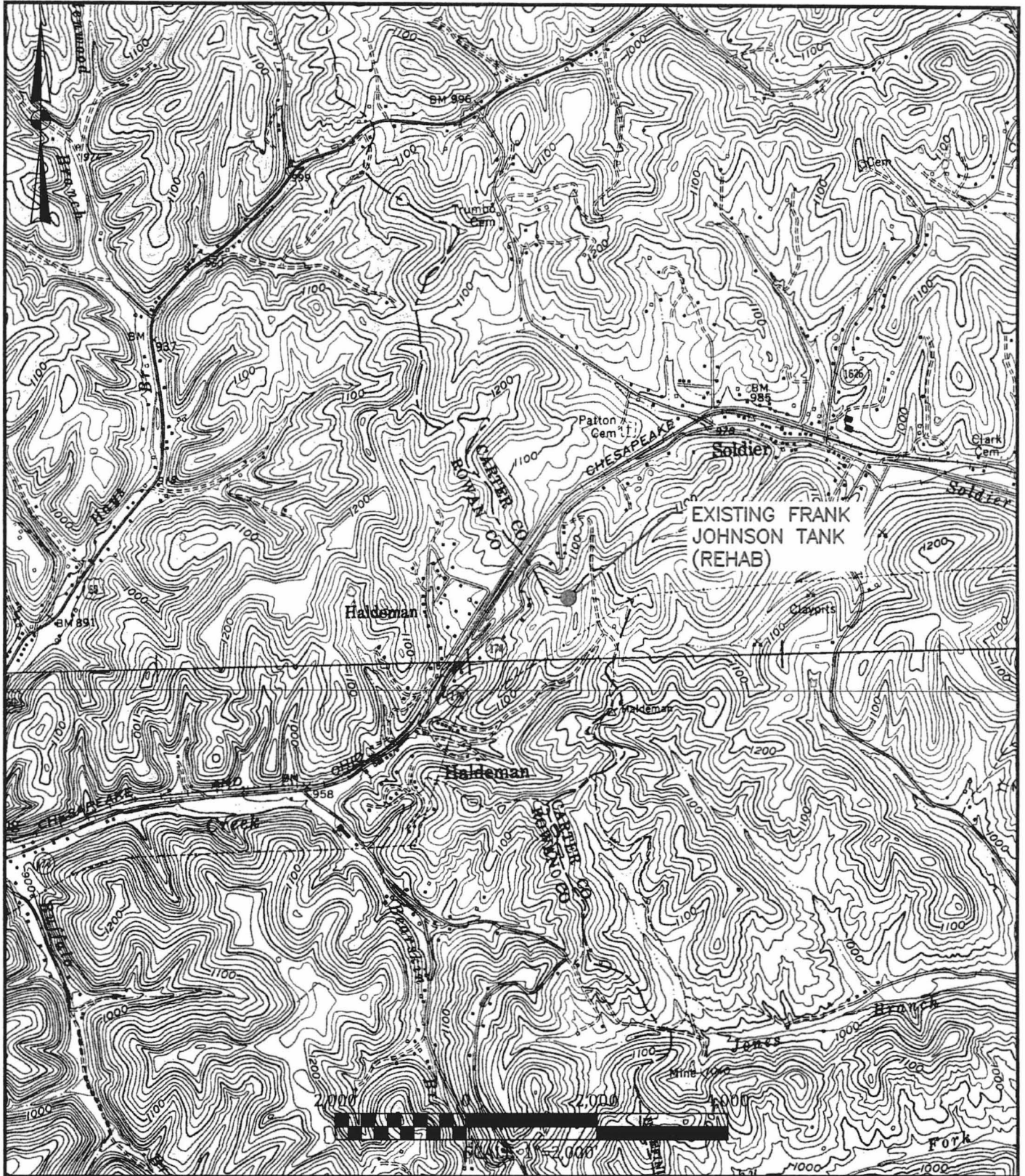
ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	5



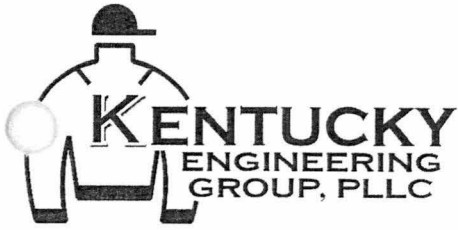
ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	6



ROWAN WATER, INC.
3-C TRAIL ELEVATED TANK

Project No.	16019
Date	MAR. 2016
Dwg. No.	
Sheet	1



APPENDIX B

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info@kyengr.com
www.kyengr.com



Rowan Water
3-C Tank
161K Glass Lined Water Storage Tank

To: Rowan Water
Kentucky Engineering Group

Attn: Riley Sumner – Kentucky Engineer Group

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: July 2014

On July 15, 2014, Horizon QC inspected the 161,000-gallon glass lined water storage tank. The purpose of the inspection was to evaluate the exterior and interior glass lining and mastic protective coating, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the standpipe water storage tank (161K Glass Lined Water Storage tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

The date of tank's construction was 1987. The manufacturer of the tank was Aquastore. Tank dimensions are 17' in diameter and 97' tall.

The tank is located in Rowan, Kentucky; and found several miles from the City of Morehead. The tank site is situated off of a paved road. The tank site is boarded on three sides with fields and one side with a road and barn. The site is not fenced. The site is accessible by vehicles but has limited parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for corrosion related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor

Interior

- Overall condition of the interior should be considered good/fair. Minor corrosion along bolt heads and seems.
- Interior concrete floor was covered with several inches of sediment.
- The perimeter of tank to base connection did not show any signs of leaks.
- No visible defects or damage to the glass found on the sidewall panels.
- Random pinhole corrosion found on the sheet edge.
- Bolt heads are in fair condition with some random corrosion areas throughout the tank.
- Interior man-way was in fair condition with minor pinhole corrosion.
- Interior inlet/outlet pipe is in fair condition with light corrosion on surface.
- No interior ladder was found.
- Interior roof vent is in good condition. No signs of any defects or damage, (Aluminum).
- Roof/sidewall seems have random pinhole corrosion on seems and boltheads. No visible signs of cracks, leaks or damage.
- Ceiling section has random corrosion along the sidewall/ceiling connection and bolt heads.
- Indicator float is not functioning. Remains hung up near the top section.
- No biological matter was seen inside the tank.

Exterior

- Overall condition can be considered good.
- Foundation is in good condition; no deterioration of the concrete. Vegetative growth has been kept low around the foundation.
- Base/sidewall seam is in good condition. No signs of leaks or cracks in the glass.
- The sidewall glass panels are in excellent condition.
- Sidewall bolt connections have some visible corrosion resulting from mastic deterioration.
- Sidewall panel sheet edge is in good condition.
- All hazard-warning signs are still present on the tank.
- Sidewall wind stiffener is in good condition. No visible signs of damage.
- Sidewall ladder is in good condition. No visible signs of damage.
- Roof Vent is in excellent condition. Screen in place and functional.
- Roof man way hatch is in good condition.
- Roof walkway and handrail is in good condition (aluminum). No signs of any damage.
- Roof panels are in excellent condition. No corrosion or damage was visible.
- Roof panel bolts and nuts have visible corrosion.
- Overflow pipe is in good condition (aluminum) no damage was visible.
- Sidewall man ways (2 -24 inch) are in good condition, no corrosion on nuts/bolts.
- Site perimeter is clean and properly maintained with vegetation kept low.

Recommendations

Interior

At present the protective glass coated and mastic protective coating that exists throughout the interior remains in fair condition. The random corrosion spots along the seams and bolt heads are the most obvious. Corrosion in these areas will only continue without a new mastic coating being applied to a clean metal substrate. These spots appear to be shallow in pit depth, but will likely increase in depth if not corrected in the next few years.

The age and condition of the interior does *not* warrant immediate remediation, however some action must be taken with the next 1-3 years before corrosion damage to the steel becomes significant.

When remediation does occur, Horizon suggests the following for remediation:

1. High-pressure power wash the interior. After interior cleaning - power tool clean all corrosion spots. (**SSPC SP-3**).
 1. High-pressure power wash the interior to remove sediment and staining.
 2. **SSPC SP-3** surface preparation for all corrosion spots.
 3. Apply NSF approved mastic to all cleaned spots.
 4. Repair float for indicator board.
 5. Install sacrificial anodes.

Exterior

At present the exterior glass lined system is in good condition with an adequate amount of protection to the underlying substrate. The age and condition of the interior does ***not*** warrant immediate remediation, however some action must be taken with the next 1-3 years before corrosion damage to the steel becomes significant.

Horizon presents the following methods of remediation for consideration:

1. All corrosion spots on manways should be power tool cleaned bare (**SSPC-SP-3**) and coated with mastic coating. (Sika Flex 1a or CIM)
2. Repair Level Indicator Board



Rowan Water
Frank Johnson Tank
220K Welded Steel Ground Storage Tank

To: Rowan Water
Kentucky Engineering Group

Attn: Riley Sumner – Kentucky Engineer Group

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: July 2014

On July 15, 2014, Horizon QC inspected the 2200,000-gallon steel ground storage tank. The purpose of the inspection was to evaluate the exterior and interior coatings, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the ground water storage tank (220K Gal. Ground Storage tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

Laurel Construction built the Frank Johnson tank in 1992. The tank is located in Rowan Co, Kentucky near the City of Morehead. The tank site is situated off of gravel road behind a farm. The tank site is boarded on all four sides with timber and is fenced. The site is accessible by vehicles but has limited parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for coating related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in

service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor

Interior

- Overall condition of the interior should be considered fair. Random spot corrosion found mostly along the weld seems.
- Interior floor is in good condition with random pinhole corrosion. Approximately 2" of flock found on the floor.
- Interior sidewall is in good/fair condition with random pinhole corrosion on the welded seems.
- Ceiling portions of the tank should be considered good/poor with areas of pinhole corrosion and corrosion along the weld seems.
- Overflow inlet attached to the sidewall is in good condition with minor corrosion spots.
- Interior roof vent has moderate corrosion.
- No interior ladder was found.
- Intake pipe is in good condition with minor corrosion on edges.
- Float was not connected.
- Interior man-way has moderate corrosion along the edges and collar portion.

Coatings test Interior

- Dry Film Thickness ranged from 9.0– 16.0 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

Exterior

- Over all condition of the exterior should be considered fair random spot corrosion and mill scale present on substrate.

- Base plates are in fair condition. The flexible sealant has deteriorated in some areas due to the growth of vegetation between the base plate and the foundation.
- Foundation is in good condition.
- Anchor bolts are in good condition with minor corrosion.
- Sidewalls are in fair condition with some random areas of corrosion to the substrate and heavy mildew and mill scale visible on the bottom sheets.
- Sidewall man way hatch 24" is in good condition with light corrosion on nuts, bolts.
- Roof portion of the tank is in fair condition some small random areas of corrosion and coating deterioration from UV attack.
- Roof Vent is in fair condition with minor corrosion found along the entire surface. The screen is in place. (20" diameter).
- Overflow pipe is in good condition with delamination and corrosion on its bottom angle.
- Discharge basin is in good condition.
- Exterior ladder is in good condition
- Level indicator is not functioning.
- Site perimeter is in good condition with light vegetation on all four sides. Fence is functional.
- Tank site was overgrown with vegetation.
- Tank was locked.

Coatings Test Exterior

- Average DFT (dry film thickness) range was 7.8 to 12.0 mils.
- ASTM 3359 Adhesion testing (moderate adhesion) of protective coatings.
- Solvent Sensitivity Test-ASTM D5402 found exterior finish coat with a moderate/good resistance to MEK solvent.

Recommendations

Interior

At present the existing coating system of the interior wet portion of the tank is adequately protecting 90% of the steel substrate. The corrosion found on the ceiling and weld seems were the most obvious. The corrosion in these areas will only degrade further without new coatings being applied to a clean metal substrate. The remaining spot failures throughout the tank are more isolated and random. These spots appear to be shallow in pit depth, but will likely increase in depth if not corrected. Horizon recommends so remediation of these areas in the next 2-3 years.

The following remediation of the interior wet area is recommended:

1. Wash out interior
2. Repair corrosion areas SSPC SP2 & 3 Hand Power Tool Cleaning
3. Caulk seams above water.
4. Grind off weld spatter near weld seams.
5. Plate any holes or pitted areas where metal loss is more than half of steel thickness.
6. Apply pit filler to pitted areas.
7. Apply new coating system to prepared areas.
8. Repair or remove Level Indicator equipment.

Exterior

At present the exterior substrate is in good condition with only a few corrosion spots. System officials should consider minor repairs to be preformed on these random corrosion areas. Over-coating should not be considered due to mill scale present on substrate. Horizon recommends so remediation of these areas in the next 2-3 years.

The following two methods of remediation for consideration:

1. New Grout applied to the base plate of the tank
2. Power wash clean tank to remove mildew.
3. Spot clean all corrosion – SSPC SP3 Power Tool
4. Apply coatings to cleaned areas.
5. Repair Indicator Board
6. Clean tank site of vegetation



Rowan Water
Maxey Flats Tank
150K Welded Steel Ground Storage Tank

To: Rowan Water
Kentucky Engineering Group

Attn: Riley Sumner – Kentucky Engineer Group

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: July 2014

On July 15, 2014, Horizon QC inspected the 150,000-gallon steel ground storage tank. The purpose of the inspection was to evaluate the exterior and interior coatings, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the ground water storage tank (150K Gal. Ground Storage tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

Caldwell Tank constructed the Maxey Flats tank in 1982. Tank dimensions are 28' in diameter and 30' tall.

The tank is located in Rowan Co, Kentucky near the City of Morehead. The tank site is situated off of gravel road behind a farm. The tank site is boarded on all four sides with timber and is fenced. The site is accessible by vehicles but has limited parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for coating related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor

Interior

- Overall condition of the interior should be considered good. Minor corrosion along seems on the ceiling and roof supports.
- Interior floor is in good condition with approximately 2" of sediment.
- Interior sidewall is in good/fair condition with random pinhole corrosion on the lower sidewall sheets. Abrasions cause of corrosion.
- Ceiling portions of the tank should be considered good/poor with areas of pinhole corrosion and corrosion along the weld seems and roof supports
- Overflow inlet attached to the sidewall is in good condition with minor corrosion spots.
- Interior roof vent has moderate corrosion.
- No interior ladder was found.
- Intake pipe is in good condition with minor corrosion on edges.
- Float was not connected.
- Center Support Beam is in good condition with minor pinhole corrosion found throughout.
- Interior man-way has moderate corrosion along the edges and collar portion.

Coatings test Interior

- Dry Film Thickness ranged from 8.7 – 14.0 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

Exterior

- Over all condition of the exterior should be considered good with several small random areas of spot corrosion.
- Base plates are in fair condition. The flexible sealant has deteriorated in some areas due to the growth of vegetation between the base plate and the foundation.
- Foundation is in good condition.
- Anchor bolts - NA
- Sidewalls are in good condition with some random areas of corrosion to the substrate and heavy mildew on the bottom sheets.
- Sidewall man way hatch (2) 24" is in good condition with light corrosion on nuts, bolts.
- Roof portion of the tank is in good condition some small random areas of corrosion and coating deterioration from UV attack.
- Roof Vent is in good condition with minor corrosion found along the entire surface. The screen is in place. (24" diameter).
- Overflow pipe is in good condition with delamination and corrosion on its bottom angle.
- Discharge basin not present.
- Exterior ladder is in good condition.
- Site perimeter is in good condition with light vegetation on all four sides.
- Site is fenced and locked.
- Tank site was properly maintained.

Coatings Test Exterior

- Average DFT (dry film thickness) range was 8.4 to 12.4 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

- Solvent Sensitivity Test-ASTM D5402 found exterior finish coat with a moderate/good resistance to MEK solvent.

Recommendations

Interior

At present the existing coating system of the interior wet portion of the tank is adequately protecting 90% of the steel substrate. The corrosion found within the sheets, lapped seams were the most obvious. The corrosion in these areas will only degrade further without new coatings being applied to a clean metal substrate. The remaining spot failures throughout the tank are more isolated and random. These spots appear to be shallow in pit depth, but will likely increase in depth if not corrected. Horizon recommends repair work with in the next 3-4 years.

The following remediation of the interior wet area is recommended:

1. Wash out interior
2. Spot repairs SSPC SP 2 & 3 on all corrosion spots.
3. Caulk seams above water.
4. Grind off weld spatter near weld seams.
5. Plate any holes or pitted areas where metal loss is more than half of steel thickness.
6. Apply pit filler to pitted areas
7. Apply new coating system to all cleaned areas.
8. Repair or Remove Target Level Indicator

Exterior

At present the exterior substrate is in good condition with only a few corrosion spots. System officials should consider minor repair work to be preformed on the random corrosion areas. Horizon recommends repair work with in the next 3-4 years.

The following method of remediation for consideration:

1. New Grout applied to the base plate of the tank.
2. Power wash clean tank to remove mildew.
3. Spot clean all corrosion – SSPC SP3 Power Tool
4. Apply Epoxy primer and Urethane topcoat.
5. Repair Indicator Board
6. Add Discharge Basin for overflow pipe



Rowan Water, Inc.
Rock Fork Tank
91,000 Gal. Glass Lined Water Storage Tank

To: Rowan Water, Inc.

Attn: Jerry Patrick – General Manager

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: 24 May 16

On 24 May, 2016, Horizon QC inspected the 91,000-gallon glass lined water storage tank. The purpose of the inspection was to evaluate the exterior and interior glass lining and mastic protective coating, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while out of service and drained. The tanks interior was cleaned out and sterilized.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the standpipe water storage tank (91K Glass Lined Water Storage tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

The date of tank's construction was 1987. The manufacturer of the tank was Aquastore. Tank dimensions are 14' in diameter and 78' tall.

The tank is located in Rowan Co., Kentucky; just North of I-64 and Morehead, KY. The tank site is situated off of an unimproved road in a wooded lot. The site is accessible by vehicles and has limited adequate parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for corrosion related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while out of service and drained. The inspection coincided with a bullet hole repair to the side of the tank. The following observations were noted. Condition Scale: Excellent-Good-Fair-Poor

Interior

- Overall condition of the interior should be considered fair, with random areas of corrosion along the vertical and horizontal seams.
- Interior concrete floor was covered with approximately 2 to 3" of sediment. No cracks or defects noted.
- The perimeter of tank to base connection did not show any signs of leaks, cracks or damage.
- Sidewall glass panels are in good condition without any signs of cracks or damage. One bullet hole found on mid section is the exception. Hole was repaired.
- Random seam corrosion found on the sheet edge, both vertical and horizontal seams. Corrosion in places exceeds 5 inches in length and has approximately 1/8 inch of metal loss.
- Bolt heads are in fair condition with some random spots of corrosion.
- Interior man-way was in fair condition with moderate corrosion on the surface and collar.
- Interior inlet/outlet pipe is in good/fair condition, with heavy corrosion on the inner and outer wall.
- No interior ladder was found.
- Interior roof vent is in good condition. No signs of any defects or damage, (Aluminum).
- Roof/sidewall seams have random pinhole corrosion on seams and boltheads. No visible signs of cracks, leaks or damage.

- Ceiling section has random corrosion along the sidewall/ceiling connection and bolt heads.
- Indicator float is not operational.
- No biological matter was seen inside the tank.

Exterior

- Overall condition can be considered good.
- Foundation is in good condition; a few hairline cracks are visible. Vegetative growth has been kept low around the foundation.
- Base/sidewall seam is in good condition. No signs of leaks or cracks in the glass.
- The sidewall glass panels are in good condition. No signs of leaks or cracks in the glass. *Note bullet hole in mid section was repaired.
- Sidewall bolt connections have some visible corrosion resulting from mastic deterioration.
- Sidewall panel sheets edge are in good condition. No signs of leaks or cracks in the glass
- Deterioration noted on hazard-warning signs.
- Sidewall wind stiffener is in good condition. No visible signs of damage.
- Sidewall ladder is in good condition, with random areas of light corrosion.
- Roof vent is in good condition; screen in place and functional.
- Roof man-way hatch is in good condition. Some light surface corrosion on the galvanized hatch and bolts.
- Roof walkway and handrail is in fair condition, with random areas of light corrosion. Antenna attached.
- Roof panels are in good condition. No corrosion or damage visible.
- Roof panel bolts and nuts have a some light surface corrosion.

- Overflow pipe is in good condition (aluminum) no damage was visible.
- Sidewall man-ways (2 -24 inch) are in good condition; visible corrosion on nuts/bolts.
- Site perimeter was accessible but was covered by heavy vegetative growth.

Recommendations

Interior

At present the protective glass coated and mastic protective coating that exists throughout the interior remains in fair condition. The random corrosion spots along the seams and bolt heads are the most obvious. Corrosion in these areas will only continue to deteriorate without a new mastic coating being applied to a clean metal substrate. These spots appear to be shallow in pit depth, but will likely increase in depth if not corrected in the next few years.

The age and condition of the interior does warrant immediate remediation, some action must be taken with the next 1-2 years before corrosion damage to the steel becomes significant.

When remediation does occur, Horizon suggests the following for remediation:

1. High-pressure power-wash the interior. Power tool clean all corrosion spots. (SSPC SP-3).
 1. High-pressure power-wash the interior to remove sediment and staining.
 2. SSPC SP-3 surface preparation for all corrosion spots.
 3. Apply NSF approved mastic to all cleaned spots.
 4. Install new sacrificial anodes.
 5. New Man-way gasket, bolts and nuts.

Exterior

At present the exterior glass lined system is in good condition with an adequate amount of protection to the underlying substrate.

Horizon presents the following methods of remediation for consideration:

1. Power wash exterior
2. Install new screen for overflow pipe.
3. Secure telemetry cables to ladder.
4. All failing spots should be power tool cleaned bare (SSPC-SP-3) and coated with mastic coating. (Sika Flex 1a or CIM)
5. Remove non operational cables from level indicator.
6. Spray site for weed growth.

Preliminary Project Cost Estimate

Project : Rowan Water Inc.

Date :

Job No. :

Revised : 01/16/17

Est. By: RS

ITEM NO.	SUMMARY OF: 2016 Water System Improvements	QUANTITY				TOTAL COST
		NO. OF UNITS	UNIT MEAS.	COST PER UNIT		
1	150,000 Gallon Elevated Tank	1	LS	\$770,000		\$770,000.00
2	Demolition of Existing 3-C Trail Tank	1	LS	\$25,000		\$25,000.00
3	Transfer of Existing RTU	1	LS	\$1,000		\$1,000.00
4	New Above Ground Booster Pump Station	1	LS	\$174,000		\$174,000.00
5	Frank Johnson Tank Rehabilitation/Mixing	1	LS	\$75,000		\$75,000.00
6	Maxey Flats Rehabilitation	1	LS	\$40,000		\$40,000.00
7	Rock Fork Tank Interior Resealment	1	LS	\$30,000		\$30,000.00
8	US 60 Master Meter Vault Replacment	1	LS	\$70,000		\$70,000.00
9	8" Class 200 water main to tank (2)	1,880	LF	\$22		\$41,000.00
	SUBTOTAL AMOUNT					\$ 1,226,000.00
	10% CONST. CONTINGENCY					\$ 122,600.00
	ENGINEERING DESIGN	8.58%				\$ 105,180.00
	RESIDENT INSPECTION	5.37%				\$ 65,900.00
	LEGAL AND ADMINISTRATION					\$ 15,000.00
	OTHER					\$ 45,000.00
	TOTAL ESTIMATED CONSTRUCTION COST					\$ 1,579,680.00