Final Engineering Report

Parkers Lake, Stearns, and Prison Tank Rehabilitation

prepared for:

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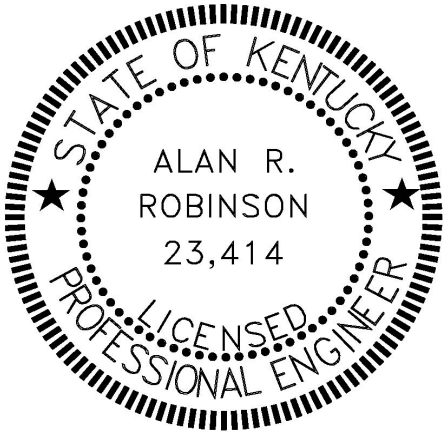

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Chapter I - General

Applicant Name: McCreary County Water District

The McCreary County Water District (MCWD) is the sole entity that provides water and wastewater services to McCreary County. Due to the county being primarily forest, the majority of it is owned by the federal government. Approximately 43% is owned and managed by the Daniel Boone National Forest, and an additional 18% of the county is owned and managed by the National Park Service, also known as the Big South Fork National River and Recreation Area, totaling 61% percent of the county. McCreary County was the final county to be formed in the state of Kentucky, and currently is the only county that does not have a single incorporated city. Due to this, the county government is the sole local government agency for the entire county, making it much more difficult to urbanize populated areas due to the lack of a separate city entity. McCreary County is divided east and west by US 27¸ and divided north and south by KY 92. These two major highways run concurrently with one another making the county readily accessible from other surrounding counties. In addition to easy transportation accessibility, the county is also served by Norfolk Southern Railway, which includes several industrial sidings in the area, including a major railway traffic interchange with the Kentucky and Tennessee Railway in Stearns, Kentucky.

To better serve existing and future customers, McCreary County Water District desires to rehabilitate three existing aged water tanks. The first water tank is located in Parkers Lake along KY 90 (Cumberland Falls Road) approximately 0.50 miles off of South US Hwy 27. The second tank is located in Stearns along Dick Road approximately 0.15 off of KY 92 (Wilburn K. Ross Hwy). The third tank is located in Pine Knot along Meadows Grove Road approximately 0.35 miles from the intersection of KY 2792 and Indian Knob Road. The rehabilitation project of the three water tanks will be funded by a USDA Rural Development Loan.

Chapter II – Project Planning Area

A. Location

A location map showing the project site is included in Appendix A.

B. Environmental Resources

Appendix B contains a copy of the FEMA maps for McCreary County influenced by the project area. There will be no stream and/or creek crossings required for the construction of this project, and will be avoided from being disturbed when possible.

C. Growth Areas and Population Trends

McCreary County experienced minimal population growth from 2000 to 2015. The county's population only increased five percent during this time. However, until recently, the county experienced considerable growth from the past several decades.

Population projections from the Kentucky State Data Center indicate that the county will continue to experience minimal growth through the year 2020, then will most likely plateau and begin to slightly decline over the next 20 years to the year 2040. This is most likely due to the majority of the county being primarily forest and comprised of rural areas, therefore, very little development is foreseen in the future to the county's urban areas to help increase and sustain population growth.

Population Data and Projections
McCreary County, Kentucky

Year	Population
1970[1]	12,548
1980[1]	15,634
1990[1]	15,603
2000[1]	17,078
2010[2]	18,306
2015[2]	17,878
2020[2]	*17,840*
2025[2]	*17,630*
2030[2]	*17,320*
2035[2]	*16,929*
2040[2]	*16,486*

Notes: [1]Source: http://population.us/
[2]Source: Kentucky State Data Center, www.ksdc.org

D. Socio-Economic Conditions

Since 2017, McCreary County employment has been dominated by the private industry sector, followed by trade, transportation, and utilities, as well as, education and health, and leisure and hospitality sectors. The private industry sector accounted for approximately 47 percent of all jobs in 2017, and the trade, transportation, utilities, education and health services, leisure and hospitality, and financial activities sectors accounted for 32 percent of all employment in 2017. All other employment sectors accounted for only 14 percent of all employment in McCreary County in 2017.

The importance of the private industry sector to the economic base of McCreary County has continued to exceed other major industries within the county. In the 1980's and early 1990's natural resources, coal mining, timber, and manufacturing played a vital role in the county's stability and growth, but by the late 1990's and early 2000's, these once economical influences quickly dissipated and dried up. This in turn caused the county to quickly adjust its approach in continuing to bring economic stability to the county, therefore allowing the private sectors to grow and develop rapidly.

Agriculture has never played an important role in the county's economy due to extreme topography and primarily forest inhabiting the county. In the early 2000's approximately only five percent of the county was farmland, and continues to remain generally the same today. These low numbers are because the county has never been able to sustain any substantial agricultural industries, which is primarily due to the majority of the county being owned by the federal government. McCreary County is currently ranked 111 out of 120 counties in overall agricultural production.

McCreary County Employment by Major Industry and Wages by Category, 2017[1]

Category	Employment (McCreary Co.)	Average Weekly Wage (McCreary Co.)	Average Weekly Wage (Kentucky)
Natural Resources and Mining	2	$279	$1,049
Construction	20	$534	$1,011
Manufacturing	185	$545	$1,108
Trade, Transportation, and Utilities	467	$567	$789
Information	19	$1,116	$1,044
Financial Activities	131	$582	$1,236
Professional and Business Services	53	$440	$931
Education and Health Services	278	$418	$906
Leisure and Hospitality	242	$231	$327
Other Services and Unclassified	34	$345	$626
Total Private Industries	1,432	$482	$865
Total (All Industries)	**3,074**	**$645**	**$845**

[1]Source: U.S Department of Labor, Bureau of Labor Statistics.

Major Manufacturing Firms and Employment in McCreary County – 2019[1]

Firm	Employment	Year Established
McCreary County Hardwood, Inc.	33	1988
Pine Knot Lumber, Inc.	47	1978
Outdoor Venture Corporation	160	1972

Note: [1]Source: Kentucky Cabinet for Economic Development, 2019

Chapter III - Existing Facilities

A. Location Map

McCreary County Water District desires to rehabilitate three existing aged water tanks located in various regions within the county. The first water tank is located in Parkers Lake approximately 8 miles north of Whitley City, along KY 90 (Cumberland Falls Road) approximately 0.50 miles off of US Hwy 27. The second tank is located in Stearns KY approximately 2 miles southwest of Whitley City, along Dick Road and less than 1 mile off of KY 92 (Wilburn K. Ross Hwy). The third tank is located in Pine Knot approximately 6 miles southeast of Whitley City, along Meadows Grove Road approximately 0.35 miles from the intersection of KY 2792 and Indian Knob Road, in McCreary County.

B. History

McCreary County Water District (MCWD) has a record of providing excellent water and sewer services to industries and private businesses that continue to come to McCreary County. MCWD has been proactive in providing enough capacity in their water and wastewater treatment plants to provide for ample growth in the economy as the county continues to grow in population and economic development.

C. Condition of Facilities

MCWD owns and operates the public water and wastewater systems in McCreary County. The water system serves approximately 6,200 total customers throughout the entire county and the wastewater system serves approximately 1,100 total customers primarily in the area in and around Whitley City. MCWD operates two water treatment plants (WTP) and one wastewater treatment plant (WWTP).

Chapter IV- Need for Project

A. Health and Safety

The Parkers Lake, Stearns, and Prison tanks are all in need of either exterior painting, interior painting, or both. These tanks are all painted steel, by design, and require period resurfacing to reduce the risk of corrosion. Left untreated, the original coatings will deteriorate. Most paint has at least a 20-year life before resurfacing is necessary. Health and safety risks arise when tank coatings are left unaddressed. Exterior corrosion can lead to safety issues such as structural fatigue. Interior corrosion can lead to health issues since potable water is in contact in the tank with this surface. Therefore, the rehabilitation of the Parkers Lake, Stearns, and Prison water tank surface coats will help improve and reduce the risk to public health of unwanted contaminants leaching into potable water sources.

B. System Operation & Maintenance

This project will provide a much more reliable, sustainable, water system throughout various regions of the county. Fewer trips from operators to inspect, perform maintenance, and make necessary repairs to ensure optimal performance will be needed, saving travel costs.

C. Growth

As stated above, McCreary County has been and is projected to remain constant in economic development and population that is concurrent with other rural counties within the state of Kentucky. Providing exceptional water services will be a key component to increasingly help sustain this consistent growth and development within the county. Therefore, the rehabilitation of the Parkers Lake, Stearns, and Prison water tanks will ensure optimal holding capacity and performance accompanied by the expansion of MCWD's water distribution system will be vital in successfully allowing for opportunistic growth and development throughout the county.

Chapter V – Alternatives Considered

A. Description

Alternatives to provide water to the residents throughout the areas in McCreary County affected by the Parkers Lake, Stearns, and Prison water tanks include the following:

- Rehabilitate the Parkers Lake, Stearns, and Prison Tank with the necessary surface coatings, proper maintenance repairs, and repairs needed to assure maximum holding capacity and flow. This alternative would be best and would safeguard system pressures and storage by extending the useful life of all three tanks.

- Rehabilitate only one or two of the listed tanks rather than all three tanks that are needed. This alternative would be better than the "do nothing" alternative and would improve the portion of the water system where the rehabilitated tank is located. However, the portion of the water system which is supplied from the tank(s) not included in the project would continue to be at risk with further corrosion.

- Do nothing. Continue to serve customers throughout the areas in McCreary County affected by the Parkers Lake, Stearns, and Prison water tanks as normal.

If either of the second two alternatives are chosen, high maintenance and repiar costs will continue to accumulate.

B. Environmental Impacts

None of the alternatives mentioned will have direct environmental impacts on the diversity of wildlife, or the habitat within the project area since the tanks sites are previously disturbed areas.

Chapter VI – Proposed Project (Recommended Alternative)

The selected alternative is Alternative No. 1 – Rehabilitate the Parkers Lake, Stearns, and Prison Tank with the necessary surface coatings, proper maintenance repairs, and repairs needed to assure maximum holding capacity and flow.

A. Project Design

The exteriors of the Parkers Lake, Stearns, and Prison Tank are in fair condition. Their protective coating system show clear signs of deterioration indicative of a system near the end of its useful life. Over 5% of each of the three tank structures painted surfaces are currently showing signs of deterioration and random corrosion development. Proper tool cleaning, priming and over-coating of each of the exterior tank structures are recommended for the very near future. The interior of each tank is in poor condition with signs of delamination on the roof with flash rust on their support beams and coating of panels. Some sediment staining was visual on each of the tanks sidewalls as well. Extent of coating failure and spreading corrosion affects more than 40% of the interior structure of each tank. Current conditions of each tank indicate their coating system is beyond its useful life. A major renovation and possible repairs of each of the three tanks should be planned as soon as feasible. Below is a list of recommendations to be evaluated during the rehabilitation process of the Parkers Lake, Stearns, and Prison Tank:

Parkers Lake Tank (150,000 Gallons) Recommendations:

- Recommend to tool clean, prime, and standard 2-coat over-coat tank exterior.
- Replace overflow zinc plated bolts and replace with SST.
- Install new 24-inch bolted manway to replace existing 18-inch clamp style manway.
- Remove exterior ladder wheels and secure ladder to the tank bowl.
- Repair/replace exterior safety climb system on top of the tank.
- Blasting of interior and coating to be installed to protect the interior and prolong life of tank.
- Prime and re-coat interior ladder where corrosion exists.

- Repair/replace existing float system.
- Repair/replace sections of interior ladder where needed.
- Remove spider rods.
- Replace existing vent with new frost proof vent.
- Replace roof vent screen with Frost Proof Pallet Style Vent.
- Replace hatch lock/bolt due to corrosion.
- Tool blast and prime coat corroded areas of the access manway.

Stearns Tank (200,000 Gallons) Recommendations:

- Recommend to tool clean, prime, and standard 2 coat over-coat tank exterior.
- Replace overflow zinc plated bolts and replace with SST.
- Install new 24-inch bolted manway to replace existing 18-inch clamp style manway.
- Blasting of interior and coating to be installed to protect the interior and prolong life of tank.
- Prime and re-coat interior ladder where corrosion exists.
- Repair/replace existing float system.
- Replace existing vent with new frost proof vent.
- Replace roof vent with Frost Proof Pallet Style Vent.
- Replace hatch lock/bolt due to corrosion.

Prison Tank (1,000,000 Gallons) Recommendations:

- Recommend to tool clean, prime, and over coat tank exterior.
- Replace overflow zinc plated bolts and replace with SST.
- Replace existing vent and add 2 new vents on top of the tank with new frost proof vents.
- Blasting of interior and coating to be installed to protect the interior and prolong life of tank.
- Mud valve needs replaced and reconnected to the drain line.
- Expansion joint on the riser pipe needs repaired and mud valve coupling replaced. All corroded bolts and nuts to be replaced with SST.

- Replace deteriorated interior beam.
- Replace gaskets for cable holes.
- Replace flex joint.
- Replace interior ladder.
- Replace hatch lock/bolt due to corrosion.
- Replace existing roof vent with Frost Proof Pallet Style Vent.

B. Design Criteria

The proposed project will be designed using the standards established by the Natural Resources and Environmental Protection Cabinet, Kentucky Division of Water, General Design Criteria for Surface and Ground Water Supplies. In addition, the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers, Recommended Standards for Water Works, (Ten State Standards) 1997 will be used to guide the design process.

C. Cost Estimate

Detailed cost estimates of the selected alternative are provided in Appendix C.

Chapter VII – Conclusions and Recommendations

Rehabilitating the Parkers Lake, Stearns, and Prison Tank will ensure optimal holding capacity, performance, and ensure the longevity of the tank system useful life. MCWD will be capable of continuing to provide existing customers with quality water while adding new customers to these portions of their water system.

Appendix A - Location Map

Appendix B - FEMA Maps

Appendix C - Opinion of Probable Project Costs

Appendix D - Preliminary Project Costs

Final Project Costs
McCreary County Water District
Parkers Lake, Stearns, and Prison Tank Rehabilitation

PRELIMINARY BUDGET IMFORMATION			
Cost Classification	Total Cost	Cost Not Allowable	Total Allowable Cost
1. Administrative & Legal	$30,000.00	$0.00	$30,000.00
2. Land, Structures ,etc.	0.00	0.00	0.00
3. Relocation	0.00	0.00	0.00
4. Architectural & Engineering (Design, Bidding, Const. Admn.)	51,200.00	0.00	51,200.00
5. Other Architect. & Eng. Fees (Water / Sewer Rate Studies)	25,000.00	0.00	25,000.00
6. Project Inspection	43,550.00	0.00	43,550.00
7. Site Work	0.00	0.00	0.00
8. Demolition & Removal	0.00	0.00	0.00
9. Construction	521,463.00	0.00	521,463.00
10. Equipment	0.00	0.00	0.00
11. Capitalized Interest	68,537.00	0.00	68,537.00
12. SUBTOTAL	739,750.00	0.00	739,750.00
13. Contingencies	80,000.00	0.00	80,000.00
14. TOTAL PROJECT COSTS	**819,750.00**	**0.00**	**819,750.00**