

Final Engineering Report

Marsh Creek Road Waterline Replacement

prepared for:

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January 18, 2021



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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 replace an aged, deteriorating, undersized line beginning at the intersection of KY 1651 (Old US 27) and US 27, east along KY 1470 (Marsh Creek Road), and ending near the intersection of KY 1470 (Marsh Creek Road) and KY 92 in McCreary County. The new waterline replacement project will be funded by a Community Development Block Grant (CDBG), accompanied 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 minimal stream and creek crossings required for the construction of this project, and will be avoided 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 contained 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: ¹Source: <http://population.us/>
²Source: Kentucky State Data Center, www.ksdc.org

D. Socio-Economic Conditions

Since 2015, 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 58 percent of all jobs in 2015, and the trade, transportation, utilities, education and health services, leisure and hospitality, and financial activities sectors accounted for 38 percent of all employment in 2015. All other employment sectors accounted for only 4 percent of all employment in McCreary County in 2015.

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 112 out of 120 counties in overall agricultural production.

McCreary County Employment by Major Industry and Wages by Category, 2015¹

Category	Employment (McCreary Co.)	Average Weekly Wage (McCreary Co.)	Average Weekly Wage (Kentucky)
Natural Resources and Mining	N/A	N/A	\$1,075
Construction	N/A	N/A	\$993
Manufacturing	N/A	N/A	\$1,091
Trade, Transportation, and Utilities	305	\$440	\$758
Information	N/A	N/A	\$944
Financial Activities	129	\$552	\$1,169
Professional and Business Services	50	\$473	\$878
Education and Health Services	297	\$541	\$878
Leisure and Hospitality	219	\$225	\$312
Other Services and Unclassified	39	\$275	\$591
Total Private Industries	1,437	\$477	\$831
Total (All Industries)	2,476	\$646	\$834

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

Major Manufacturing Firms and Employment in McCreary County – 2018¹

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

Note: ¹Source: Kentucky Cabinet for Economic Development, 2018

Chapter III - Existing Facilities

A. Location Map

KY 1470 (Marsh Creek Road) is located in south central McCreary County directly off of US Highway 27 approximately seven miles south of Whitley City, and approximately three miles north of the Kentucky-Tennessee border. The project will span the corridor of KY 1470 beginning at the intersection of KY 1470 and US 27, and ending near the intersection of KY 1470 and KY 92 for a distance of approximately six miles.

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 7,000 total customers throughout the entire county and the wastewater system serves approximately 1,200 total customers primarily in the area in and around Whitley City. MCWD operates two water treatment plants (WTP) and one wastewater treatment plant (WWTP).

Drinking water is sold via wholesale agreement to Whitley County Water District. This wholesale water travels through the subject waterline along Marsh Creek Road. With the poor condition and low pressure rating of the existing line, this service is interrupted upon routine line breaks along with MCWD residential customers at higher elevations.

Chapter IV- Need for Project

A. Health and Safety

This area of McCreary County is known for having wet, marshy soil conditions that do not favor water percolating into the soil. These conditions can lead to contaminants leaching into deteriorated waterlines while pressure is interrupted. The installation of new waterlines using proper bedding and backfill will help improve and reduce the risk to public health of unwanted contaminants leaching into potable waterlines.

B. System Operation & Maintenance

This project will provide a much more reliable, sustainable water system for the southeast section of the county. Higher pressures will be able to be sustained which will decrease electric pumping costs. Fewer trips from operators to repair line breaks 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, replacing undersized and deteriorating waterlines 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 along KY 1470 (Marsh Creek Road) include the following:

- Replace waterlines with larger size lines equipped to handle more volume and flow. This alternative would be best and would improve residual pressures, as well as, safeguard dynamic pressure losses.

- Replace waterlines in kind with same size lines. This alternative would be better than the “do nothing” alternative but wouldn’t improve residual pressures and would experience the same dynamic pressure losses and risk for service interruptions as currently exists.
- Do nothing. Continue to serve customers along Marsh Creek Road with undersized and unreliable 2-inch and 4-inch lines, including a wholesale customer to the east.

If either of the second two alternatives are chosen, high maintenance costs will continue, more waterline breaks and pressure losses will occur, and a less efficient waterline will be constructed to serve customers.

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. A Fish and Wildlife Service National Wetlands Inventory Map is included in Appendix B.

Chapter VI – Proposed Project (Recommended Alternative)

The selected alternative is Alternative No. 1 – Replace waterlines with larger size lines capable of moving more flow and sustaining higher pressures.

A. Project Design

This project will consist of approximately 30,633 LF of 6-inch PVC SDR 17 waterline to replace existing 2-inch, 3-inch, and 4-inch waterlines along Marsh Creek Rd near Strunk, KY. The project will begin near US 27 to the west and will end at KY 92 to the east. This project corridor has an extreme elevation change from 1430+/- on the west end to 1050 +/- on the east end of the project. From the Strunk storage tank overflow elevation of 1588, a static pressure of over 230 psi exists in some areas at the lower elevations. When leaks at this pressure occur on the existing

2-inch waterline, a large pressure drop occurs and leaves the residences at higher elevations with very low pressure if any at times. The existing waterlines along this corridor date back to the 1960's and are prone to frequent breaks. The proposed waterline will be PVC SDR 17 which is rated for 250 psi of working pressure. Also, the proposed line will be 6-inch in diameter which will not be as heavily impacted by 20 gallon per minute leak as the 2-inch line is currently. This proposed waterline will serve as the transmission main moving water further to the east to the existing New Liberty storage tank and continuing to Whitley County Water District. WCWD is a wholesale customer of MCWD and customers on the west end of their system have been very low or without water on occasions due to line breaks on the undersized, unreliable existing waterlines which MCWD feeds them from. All utility design will be coordinated with the respective utility owners.

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

By constructing the appropriate waterline system to replace the existing lines along Marsh Creek Road, more residents will be ensured safe, reliable water service. Fire protection flowrates will be made available to a part of the county where it currently doesn't exist. MCWD will be capable of adding customers to the Marsh Creek area in the future without adding stress to the system allowing MCWD to grow and expand their water distribution system.

Appendix A - Location Map

- Schematic Layout of Proposed Utilities

Appendix B - FEMA Maps

Appendix C - Opinion of Probable Project Costs

Appendix D - Preliminary Project Costs

Final Project Costs
McCreary County Water District
Marsh Creek Road Waterline Replacement

AS-BID BUDGET INFORMATION			
Cost Classification	Total Cost	Cost Not Allowable	Total Allowable Cost
1. Administrative & Legal	\$40,000.00	\$0.00	\$40,000.00
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.)	79,400.00	0.00	79,400.00
5. Other Architect. & Eng. Fees (Mapping and Hydraulic Model)	40,000.00	0.00	40,000.00
6. Project Inspection	40,000.00	0.00	40,000.00
7. Site Work	0.00	0.00	0.00
8. Demolition & Removal	0.00	0.00	0.00
9. Construction	1,033,655.50	0.00	1,033,655.50
10. Equipment	0.00	0.00	0.00
11. Misc.	0.00	0.00	0.00
12. SUBTOTAL	1,233,055.50	0.00	1,233,055.50
13. Contingencies	211,654.50	0.00	211,654.50
14. TOTAL PROJECT COSTS	1,444,710.00	0.00	1,444,710.00