



PRELIMINARY ENGINEERING REPORT

FOR

WOOD CREEK WATER DISTRICT

KY 490/U.S. 25 WATERLINE REPLACEMENTS

PREPARED BY

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PROJECT No. 2017036

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TABLE OF CONTENTS

1.0	INTRODUCTION	3
2.0	PROJECT PLANNING	3
2.1	Location.....	3
2.2	Environmental Resources Present.....	3
2.3	Population Trends	4
3.0	EXISTING FACILITIES	4
3.1	Location Map.....	4
3.2	History	4
3.3	Condition of Existing Facilities.....	5
3.4	Financial Status of Existing Facilities	6
4.0	NEED FOR PROJECT	6
4.1	Health, Sanitation, and Security	6
4.2	Aging Infrastructure	6
4.3	Reasonable Growth	7
5.0	ALTERNATIVES CONSIDERED	7
5.1	Description	7
5.2	Design Criteria	8
5.3	Map	8
5.4	Environmental Impacts.....	8
5.5	Land Requirements.....	8
5.6	Potential Construction Problems	9
5.7	Sustainability Considerations	9
5.8	Cost Estimates	9
6.0	SELECTION OF AN ALTERNATIVE	10
6.1	Life Cycle Cost Analysis.....	10
6.2	Non-Monetary Factors	13
7.0	PROPOSED PROJECT	13
7.1	Preliminary Project Design	13
7.2	Project Schedule	13
7.3	Permit Requirements	14
7.4	Total Project Cost Estimate.....	14
7.5	Excess Funding Disbursement.....	14
7.6	Annual Operating Budget	14
8.0	CONCLUSIONS AND RECOMMENDATIONS	15

TABLE OF CONTENTS CONT.

LIST OF TABLES

Table 1: Cost Estimate of Alternative #1	10
Table 2: Cost Estimate of Alternative #2	10
Table 3: Alternative #1 Life Cycle Cost Analysis	11
Table 4: Alternative #2 Life Cycle Cost Analysis	12
Table 5: Estimated Project Schedule.....	13
Table 6: Permits & Approvals Needed.....	14
Table 7: Total Project Cost Estimate	14
Table 8: Annual Operation & Maintenance Cost.....	15

APPENDIX

LIST OF FIGURES

Figure 1: Location Map	
Figure 2: Projections for Population & Water Usage	
Figure 3: Existing Operating Budget for Year Ending 2017	
Figure 4: Site Maps for Alternative #1	
Figure 5: Site Map for Alternative #2	
Figure 6: Engineer's Opinion of Probable Cost & Estimated User Rate Impact for Alternative #1	
Figure 7: Engineer's Opinion of Probable Cost & Estimated User Rate Impact for Alternative #2	
Figure 8: Site Map for Additive Alternates	

1.0 INTRODUCTION

Wood Creek Water District (WCWD), founded in 1967, is a water utility system whose purpose is to establish, develop, and operate a water supply and distribution system for its members and customers in northern Laurel County and a small portion of southern Jackson County, Kentucky. WCWD sells treated water to West Laurel Water Association (WLWA), East Laurel Water District (ELWD), and Livingston Municipal Water Works. All three utilities, WCWD, ELWD, and WLWA, are located at an office at 1670 Hal Rogers Parkway, London, KY 40741. The WLWA and ELWD have no employees, and the three utilities are operated and maintained by WCWD.

Wood Creek Water District is a regional provider of treated water in Laurel County. The raw water is sourced from Wood Creek Lake, which has essentially unlimited quantity along with excellent quality. WCWD built their treatment plant in 1967 and have expanded since, including a major expansion in 2008 that increased its capacity to 12.0 Million Gallons per Day (MGD). WCWD, along with WLWA and ELWD, serves a majority of rural Laurel County along with small portions of Clay and Jackson Counties. Many of the existing lines and pump stations throughout the system are outdated, undersized for the demand needed, and have reached the end of their usable lives. Collectively, WCWD is aiming to replace 28,500 Linear Feet (L.F.) of existing 4" and 6" waterline with 8" PVC, SDR-17 waterline, one pump station, and repaint an elevated tank along KY 490, 16,000 L.F. of 4" waterline with 8" PVC, SDR-17 waterline along U.S. 25, and 4,150 L.F. of 4" waterline with 6" PVC, SDR-17 waterline along Helvetia Road. Two additional alternates have been discussed that would replace an additional 15,200 L.F. of waterline along both KY 3094 and Old Richmond Road if funds remain at the completion of the original project. This project will be an essential step in supporting the growth of the WCWD system.

2.0 PROJECT PLANNING

2.1 Location

Founded in 1825, Laurel County was created from parts of Rockcastle, Clay, Knox, and Whitley Counties in the Commonwealth. It is situated in the southeastern region of Kentucky and sits at the heart of the Daniel Boone National Forest. London serves as the County Seat for Laurel County, and is near the geographic center of the County.

As stated previously, Wood Creek Water District is a rural water utility system. The purpose of the WCWD is to establish, develop, and operate a water supply and distribution system for its customers in northern Laurel County and southern Jackson County. Since the inception of the WCWD, there has been a steady rise in demand for clean, potable drinking water. This project will help Wood Creek Water District support this increase in demand. A location map of the system with proposed project sites and additive alternates is shown in Figure 1 of the Appendix.

2.2 Environmental Resources Present

The proposed project is located across the northern portion of Laurel County. According to the *Soil Survey of Laurel and Rockcastle Counties, Kentucky*, prepared by the USDA

Soil Conservation Service, the major natural resources in the area are coal, timber and saltpeter, however, most of the saltpeter mines were located in adjoining Rockcastle County. Large amounts of saltpeter were mined during the War of 1812, and now the saltpeter industry is dormant. The mining and timber industry have also taken a sharp decline in recent years. Laurel County has an approximate land area of 446 square miles. Of that, 220 square miles is forest land, with the Forest Service owning and managing 80 square miles, and approximately 184 square miles is designated as farmland. The most important and prominent environmental resource in the area is the soil. Soil supports farming, which is the largest industry in the area. The farms are primarily family owned, and the primary crop is tobacco. About half the farm income comes from the sale of crops while the other half comes from livestock and livestock products. However, the area is growing and adding additional jobs and industries and will need the support of this project in order to deliver a sufficient water supply to these new homes and new industries. A more detailed Environmental Report will be completed at a later date. The Environmental Report focuses closely on many more aspects of the environment, and how each respective resource will be affected by the project.

2.3 Population Trends

The population of Laurel County according to the 2010 Census conducted by the United States Census Bureau was 58,849. Wood Creek Water District currently services 5,310 customers or approximately 11,750 people. This is roughly 20 percent of the Laurel County population. Laurel County has seen a growth in population since 1980, at a rate of 1.18 percent per year. A population and water usage projection graph is attached as Figure 2 in the Appendix. Assuming the same trend will continue, the current water lines will not be able to efficiently withstand the growth. This project will allow Laurel County to grow at its current rate and provide users a sufficient potable water supply.

3.0 EXISTING FACILITIES

3.1 Location Map

A location map for the Wood Creek Water District distribution system is attached in the Appendix as Figure 1.

3.2 History

As stated previously, Wood Creek Water District was founded in 1969 and has been a regional provider of treated water since its establishment. Wood Creek Water District sells water, maintains, and operates West Laurel Water Association and East Laurel Water District. These three utilities along with the London Utility Commission and Laurel County Water District #2 make up the majority of treated water distribution in Laurel County. The existing lines in this project have been in place for nearly 30 years and the demand has outgrown what the existing waterlines can efficiently deliver. This project will upgrade these lines and one booster pump station to help WCWD run a more efficient, cost effective system.

3.3 Condition of Existing Facilities

The following description is an overview of the current system components and operating conditions:

3.3.1 Water Supply and Treatment: Wood Creek Water District is a regional provider of treated water in Laurel County with the raw water sourced from Wood Creek Lake.

The Wood Creek Water Treatment Plant (WTP) is located along Filter Plant Road near Wood Creek Lake about 1 mile off of U.S. 25. The plant was originally constructed in 1977 with the first major expansion occurring in 2008 that increased the rated capacity to 12.0 MGD. The current average daily production is approximately 3.8 MGD. As an aside, the WTP also produces water for three other water utilities in the area, East Laurel Water District, Livingston Municipal Water Works, and West Laurel Water Association, which collectively use approximately 2.20 MGD, or about 58 percent of the daily production volumes. Using data gathered from the Wood Creek Water District's monthly operating reports for 2017, the treated water produced by the WTP was:

Total Annual Volume (approx.): 1,347,365,000 Gallons
Daily Average Volume: 3,691,411 Gallons per Day
Daily Average during Maximum Month: 4,164,935 Gallons per Day
Maximum Day: 5,627,000 Gallons

3.3.2 Storage: Wood Creek Water District currently has four (4) water storage tanks that serve as finished water storage facilities. All finished water supplied by the WTP is pumped to each of the water storage tanks in the system. The construction dates for these tanks range from 1968-2004 and are inspected regularly to ensure that they are up to code. The volumes of the four tanks across the system vary from 200,000 to 2,000,000 gallons totaling at 3.25 Million Gallons (MG) with all overflow elevations at 1,420' above mean sea level.

3.3.3 Pumping Stations: Wood Creek Water District system has five (5) pumping stations located in their distribution system. These pumps are located throughout the system and range in performance from 25 gallons per minute (GPM) to 500 GPM. These pumps maintain the water level in the water storage tanks, which sets the hydraulic grade line that drives the water throughout the extents of the system. While the KY 490 pump station has performed well over the years, it has begun to show its age and cannot efficiently meet the increased demands in the system. Based on monthly operating reports from WCWD, the distributed water that has passed through this pump station is as follows:

KY 490 Pump Station:

Annual Volume: 59,787,000 Gallons
Daily Average Volume: 163,800 Gallons per Day (GPD)
Daily Average during Maximum Month: 187,647 GPD
Maximum Day: 253,519 Gallons

The pumps at the KY 490 Pump Station generally run at a rate of 200 GPM. At this pumping rate, the approximate pump run time during 2017 was:

KY 490 Pump Station:

Annual Average Day: 13.7 hours (57% of capacity)

Maximum Month Average Day: 15.6 hours (65% of capacity)

Maximum Day: 21.1 hours (88% of capacity)

3.3.4 Distribution System: The Wood Creek Water District distribution system carries a large volume of water through an aging and undersized network of lines that were constructed nearly 30 years ago. Since then, only a select few of the distribution system lines and components have been replaced. Several waterlines have been extended to the outskirts of northern Laurel County, which puts more stress on these existing lines due to the increased demand throughout the system. Without the implementation of this project, these lines will continue to age, deteriorate, and hinder WCWD with additional maintenance costs. The aging, inefficient lines will lead to reduced hydraulic transmission capacity, lower system pressures, and overall poor system performance. The current distribution system network totals over 260 miles of water distribution lines with nearly 70% being diameters 4" and less. This project will replace over 9 miles of these existing, undersized 4" lines so that WCWD may grow and provide existing customers with safe, clean drinking water in the quantities they desire.

3.4 Financial Status of Existing Facilities

The financial status of Wood Creek Water District is summarized in budget sheet attached in Figure 3 in the Appendix. The sheet shows the income generated, current operation and maintenance costs, and the existing debts of WCWD.

A Summary Addendum to Preliminary Engineering Report will be completed at a later date. The Summary Addendum will outline the projects feasibility, and determine the final rate increase needed based on more in-depth analysis of the WCWD's most recent financial statements.

4.0 NEED FOR PROJECT

4.1 Health, Sanitation, and Security

Many of the existing lines were constructed nearly 30 years ago and are badly undersized for the demand needed across the system at the present time. These inefficient lines can lead to breaks and leaks that can affect the customers' health throughout the WCWD service area. The replacement of these aging, undersized lines will ensure that WCWD will remain in compliance with federal regulations, and that end users are provided with clean, safe drinking water. After project construction, there are no other known health, sanitation, or security issues faced by WCWD.

4.2 Aging Infrastructure

The existing KY 490 water storage tank and booster pump station have been in place since 1977. While the pump station has performed well over the years, the existing pumps

are in need of an upgrade due to the increased demand in this area of the system in recent years. KY 490 water storage tank has not been blasted or repainted in several years and to extend the life of the tank, this task must be completed. As with the pump station and tank, the lines that will be replaced along KY 490, U.S. 25, and Helvetia Road have given Wood Creek Water District many problems with leaks and breaks due to age and increased demand. This project will replace the pump station and undersized, aging waterlines, and repaint the water storage tank to give WCWD a more efficient and reliable system that can easily sustain future growth throughout northern Laurel County.

4.3 Reasonable Growth

A detailed computer based hydraulic model has been developed for the Wood Creek Water District, and has been updated over several years to reflect current system conditions. The replacement of waterlines and the replacement of the existing pump station would allow for the area of northern Laurel County to accommodate future growth.

In order to predict potential usage in the future, past population growth rates were analyzed, and this data was expanded using linear regression to develop an estimated future demand based upon the population growth. The future forecast period and hydraulic design basis will be a 20 year period, (although the design life of PVC pipe is much greater) providing an approximation to the year 2039. The population growth pattern was graphed, and is shown in Figure 2 in the Appendix. According to the graph, the population of Laurel County will be approximately 76,700 people by the year 2039. Wood Creek Water District has a current customer base of 5,310 with a usage of 1.10 MGD. Assuming the same population growth pattern of 1.18 percent per year applies, an estimated customer base of 6,629 would require 1.37 MGD by the year 2039. This is an increase of approximately 25 percent over the current demand. With the construction of the proposed project, WCWD will be able to more efficiently support this increase in demand.

5.0 ALTERNATIVES CONSIDERED

5.1 Description

After consulting with Wood Creek Water District, and discussing multiple alternatives, there were three alternatives that were ultimately to be considered. There are two technically feasible alternatives and one technically infeasible alternative to be considered. The alternatives considered to be technically feasible are the proposed plan outlined in this report, or construct the project in phases based on the highest priority waterlines being replaced first. This second alternative would involve procuring the funding to replace one section of waterline and pump station and repaint an elevated tank now, and waiting to replace the additional lines along U.S. 25 and Helvetia Road at a later date. The final alternative that could be chosen is not technical in nature, but is an option that WCWD is facing. This alternative is to simply not do the project, and continue the current practice of repairing leaks when they occur, otherwise known as reactive maintenance. This has been a substantial cost for WCWD due in part to both the intense labor needed to repair lines, as well as in the physical water losses. This option also does not allow for the community to grow and maximize its potential. Since the last option is

technically infeasible, only the first options of replacement will be analyzed. Following the evaluation, one of the alternatives will be recommended to WCWD.

5.2 Design Criteria

Both technically feasible designs must be able to supply the current customer load of 5,310 with the ability to withstand the growth determined in Section 3.3 of this report. The current average daily demand for water is 1.10 MGD, with 0.163 MGD passing through KY 490 pump station. With the population growing at a rate of 1.18 percent per year, the average daily demand is estimated to grow to 1.37 MGD, with 0.205 MGD passing through KY 490 pump station. The design criteria will be that the pump station will need to be able to handle at least 0.40 MGD, preferably 0.45 MGD. The waterlines will be designed to at least the standards of the current edition of Recommended Standards for Water Works (10 State Standards). No matter which alternative is chosen, the project will need to fulfill the needs of the Wood Creek Water District by providing clean drinking water in the quantity required to sustain growth, all while remaining within the District's budget.

5.3 Map

Figure 4 in the Appendix shows the proposed waterline and pump station replacement, and tank repaint site along KY 490, as well as the proposed waterlines along U.S. 25 and Helvetia Road that will be replaced if Alternative #1 is implemented. Figure 5 in the Appendix depicts only the proposed sites along KY 490 if Alternative #2 is chosen.

5.4 Environmental Impacts

The environmental impacts of this project are minimal, as the area has been previously disturbed and the right-of-way for the waterlines have been previously cleared. However, there are differences in impacts between the two alternatives. Alternative #1 will replace all the waterlines and pump station in a single construction period. In this way, the impacts to the environment will be limited to the time of construction. Alternative #2 will require environmental disturbance at multiple, separate time periods. The overall environmental impact of Alternative #2 would be greater, due to the necessity of multiple, separate construction periods. Both alternatives were assessed, and the resources that may be potentially affected are streams and local waterways, and the soils surrounding the pipeline right-of-way. An Environmental Report will be completed at a later date to further determine the environmental impacts once an alternative is chosen.

5.5 Land Requirements

The land where the line replacement will be executed is on an existing right-of-way from the Kentucky Department of Transportation and residential land owners. In order to proceed with the project, an encroachment permit from the County and Kentucky Department of Highways will need to be obtained. The location for the pump station site will be on an easement that has been acquired by the District.

5.6 Potential Construction Problems

Both alternatives would face similar construction issues. The lines that are to be replaced may cause minimal traffic concerns depending on work space in the right-of-way. Utilizing traditional open trench and backfill construction, there could be daily lane closures until the new sections of line were in place, but are not likely. Another concern that was considered while evaluating potential construction problems that each alternative might face is the severity of tree removal. The land area where new lines are to be constructed will be minimal and due to the construction on existing right-of-way, tree removal is not a likely concern. If tree removal is deemed necessary though, the removal or mitigation operations will be conducted in accordance with the Endangered Species Act (ESA) Compliance Options listed in the Version 2: June 2016, Revised Conservation Strategy for Forest Dwelling Bats published by the U.S. Fish and Wildlife Service, Kentucky Field Office. Both alternatives have been analyzed, and there are no other foreseeable construction issues beyond these which have been addressed.

5.7 Sustainability Considerations

For sustainability considerations, both alternatives would utilize PVC pipe in their design. PVC pipe has many advantages over similar specification metal pipe. Some of these advantages include energy efficiency (both in manufacturing effort as well as pumping costs for the Owner), NSF sustainability certification, lower purchase and construction costs per linear foot, as well as widely and readily available. PVC pipe is also formed with inert materials, which makes it less susceptible to corrosion. Also, AWWA, an industry leader in water treatment and distribution, has performed and analyzed the results of a recent study concerning the longevity of PVC pipe. The study results showed that PVC pipe has a useful life of well over 100 years. With this product's performance, advantages, and useful design life of at least 50 years, WCWD and its potable water customers will be well served for many years to come.

5.8 Cost Estimates

Table 1 on the following page shows the following breakdown of costs associated with the project if Alternative #1 (waterline and pump station replacements and tank repainting) is chosen. The primary costs considered were legal fees, engineering fees, project construction, contingency, environmental, as well as other miscellaneous costs. Figure 6 in the Appendix shows a detailed Engineer's Opinion of Probable Cost & Estimated User Rate Impact for Alternative #1.

Category	Cost
Construction	\$2,886,360
Contingency	288,920
Engineering Design Fee	244,600
Construction Observation	101,120
Preliminary Engineering Report	15,000
Legal Fees	30,000
Environmental	20,000
Lands & Rights	10,000
Interim Interest	82,000
Total Project Cost	\$3,678,000

Table 2 below shows the following breakdown of costs associated with the project if Alternative #2 (reduced project) is chosen. The primary costs considered were legal fees, engineering fees, project construction, contingency, environmental, as well as other miscellaneous costs. Figure 7 in the Appendix shows a detailed Engineer's Opinion of Probable Cost & Estimated User Rate Impact for Alternative #2.

Category	Cost
Construction	\$1,648,550
Contingency	165,050
Engineering Design Fee	132,700
Construction Observation	57,700
Preliminary Engineering Report	10,000
Legal Fees	23,000
Environmental	20,000
Land & Appraisals	10,000
Interim Interest	43,000
Total Project Cost	\$2,110,000

6.0 SELECTION OF AN ALTERNATIVE

6.1 Life Cycle Cost Analysis

Tables 3 and 4 show the Life Cycle Cost Analysis for the project alternatives, as well as the values for planning period and discount rate that were used when performing the calculations. To interpret the results of the Life Cycle Cost Analysis, it is important to understand the contextual situation of the analysis. Since both of the alternatives aim to complete the same task, this is considered to be a fixed output analysis. Whichever alternative has the lowest net present value (NPV) is the alternative that should be chosen.

The Annual Operation and Maintenance (O&M) values used in the analysis were obtained by increasing the 2017 O&M values by 2 percent per year for 3 years, with slight changes made based on the 2019 projections to obtain the Purchased Water and Power and Transmission and Distribution values. Purchased Water and Power was reduced by 15 percent to account for the completion of the KY 490 pump station in both Alternatives #1 and #2. In Alternative #1, Transmission and Distribution was reduced by 10 percent due to the completion of the full project. In Alternative #2, Transmission and Distribution was reduced by 5 percent due to only half of the line replacement being constructed and increases in materials costs for reactive maintenance along U.S. 25. Tables 3 and 4 are the expected values for the first year of operation (2020) for Alternatives #1 and #2, respectively.

Table 3: Alternative #1 Life Cycle Cost Analysis		
Capital Expense		\$3,678,000.00
Annual O&M		
Purchased Water and Power	\$290,588.00	
Water Treatment	1,503,972.00	
Transmission and Distribution	1,052,296.00	
Administration of Customer Accounts	394,121.00	
Administration and General	545,483.00	
Pension Expense	0.00	
Amortization	3,152.00	
Total O & M Cost	<u>\$3,789,612.00</u>	
USPW Factor	x 18.99	
Present Worth; Annual O&M		\$71,964,732.00
Salvage Value		
Existing Facilities	\$20,406,276.00	
Proposed Improvements	1,731,816.00	
Total Salvage Value	<u>\$22,138,092.00</u>	
SPPW Factor	x 0.91	
Present Worth; Salvage		\$20,145,664.00
Net Present Value:		\$55,497,068.00

Table 4: Alternative #2 Life Cycle Cost Analysis

Capital Expense		\$2,110,000 .00
Annual O&M		
Purchased Water and Power	\$290,588.00	
Water Treatment	1,503,972.00	
Transmission and Distribution	1,110,757.00	
Administration of Customer Accounts	394,121.00	
Administration and General	545,483.00	
Pension Expense	0.00	
Amortization	3,152.00	
Total O & M Cost	<u>\$3,848,073.00</u>	
USPW Factor	x 18.99	
Present Worth; Annual O&M		\$74,979,280.00
Salvage Value		
Existing Facilities	\$20,406,276.00	
Proposed Improvements	989,130.00	
Total Salvage Value	<u>\$21,395,406.00</u>	
SPPW Factor	x 0.91	
Present Worth; Salvage		\$19,469,819.00
Net Present Value:		\$57,619,461.00

Notes and Equations Used in Life Cycle Cost Analysis:

Interest Rate (i) = 0.5%

Planning Period (n) = 20 years

Estimated Purchased Water and Power = (Existing Purchased Water and Power x 1.02³) x 0.85

Estimated Transmission and Distribution for Alternative #1

= (Existing Transmission and Distribution x 1.02³) x 0.9

Estimated Transmission and Distribution for Alternative #2

= (Existing Transmission and Distribution x 1.02³) x 0.95

Salvage Value; Existing Facilities = Straight Line Depreciation value from utility's financial statement

Salvage Value; Proposed Improvements = Straight Line Depreciation of construction cost from PER

Assumed life of 50 years, depreciated over 20 years

$$NPV = \text{Capital} + (\text{USPW} * \text{Total O\&M}) - (\text{SPPW} * \text{Total Salvage Value})$$

$$\text{Uniform Series Present Worth Factor (USPW)} = \frac{(1+i)^n - 1}{i(1+i)^n}$$

$$\text{Example USPW} = \frac{((1 + .005)^{20} - 1)}{(.005(1 + .005)^{20})} = 18.99$$

$$\text{Single Payment Present Worth Factor (SPPW)} = (1+i)^{-n}$$

$$\text{Example SPPW} = (1 + .005)^{-20} = 0.91$$

6.2 Non-Monetary Factors

There are two technically feasible alternatives being considered, and there were no foreseeable non-monetary factors that would play a role in this project if either of the project alternatives were chosen.

7.0 PROPOSED PROJECT

7.1 Preliminary Project Design

It is upon recommendation of the project engineer that Alternative #1 (waterline and pump station replacement and tank repainting) be constructed. Based upon current conditions, client budget, environmental impacts, and future forecasting, Alternative #1 will be most effective in meeting the needs of the client. As this project is a drinking water project, the following items need to be addressed:

7.1.1 Project Layout: The primary focus of this project is to replace existing water lines, one booster pump station, and repaint an elevated water storage tank. Waterlines along KY 490 and U.S. 25 have given the District problems over the years with leaks and breaks due to the lines being undersized and the increased demand in the system. These lines will be replaced and upgraded from 4" and 6" PVC, SDR-26 pipe to 8" PVC, SDR-17 pipe along KY 490 and to 8" PVC, SDR-17 pipe along U.S. 25. These lines will be far less susceptible to breaks and leaks due to the upgrade in pressure classification, which currently plagues the existing lines. The new lines will also provide increased hydraulic capacity to serve the extents of WCWD's system for many years to come. Along with these line replacements, one pump station will be replaced and one elevated water storage tank will be repainted, both located along KY 490. This pump station has performed well, but has reached the end of its usable life due to increased demands in these areas of the system. New, more efficient pumps will be installed in the pump station and will be equipped with telemetry communications to allow for the District to save on operational costs. The water storage tank along KY 490 has not been blasted and repainted in several years and badly needs both to be done to extend the life of the tank. With the new waterlines, pump station and repainted tank, Wood Creek Water District will now be able to reliably and efficiently provide water across the system for the foreseeable future without issue.

7.2 Project Schedule

Table 5 shown below contains the proposed completion dates for the major project components. This list is not exhaustive of all project tasks, and the dates shown are tentative.

Category	Estimated Date
Environmental Review Submittal	December 1, 2018
Bid Opening	May 1, 2019
Construction Start	July 1, 2019
Construction Completion	March 1, 2020

7.3 Permit Requirements

Table 6 shown below is a tentative list of permits and approvals that will need to be obtained before project construction can begin. This list is preliminary and is subject to change following the review process of the required agencies.

Agency	Permit or Approval
KY Division of Water	Approval of Plans & Specifications
KY Division of Water	KPDES Permit
KY Division of Water	Stream Construction Permit
KY Department of Transportation	Encroachment Permit

7.4 Total Project Cost Estimate

Table 7 shown below is a summarized version of the Engineer's Opinion of Probable Cost for the recommended alternative as described above. The detailed Engineer's Opinion of Probable Cost is included in the Appendix as Figure 6.

Category	Cost
Construction	\$2,886,360
Contingency	288,920
Engineering Design Fee	244,600
Construction Observation	101,120
Preliminary Engineering Report	15,000
Legal Fees	30,000
Environmental	20,000
Lands & Rights	10,000
Interim Interest	82,000
Total Project Cost	\$3,678,000

7.5 Excess Funding Disbursement

Any remaining funds leftover after the project has been substantially completed will be used to fund the following items as needed or deemed most appropriate by the Wood Creek Water District: waterline replacement north along Old Richmond Road from U.S. 25 to 1,000 L.F. from the intersection with KY 3434 and east along KY 3094 from U.S. 25 to the railroad tracks in East Bernstadt, additional Radio Read Water Meters, or painting and minor repairs at the Water Treatment Plant. A site map of the two additive waterline replacements are attached as Figure 8 in the Appendix.

7.6 Annual Operating Budget

Table 8 shown on the following page is a summarized version of the Existing Operating Budget for Year Ending 2017 and proposed operation and maintenance costs upon

project completion. The full Existing Operating Budget for Year Ending 2017 is included in the Appendix as Figure 3.

Category	Existing	Proposed
Purchased Water and Power	\$328,593	\$290,588
Water Treatment	1,417,226	1,503,972
Transmission and Distribution	1,123,816	1,052,296
Administration of Customer Accounts	371,389	394,121
Administration and General	514,021	545,483
Pension Expense	---	---
Amortization	2,970	3,152
Total Operation & Maintenance Cost	\$ 3,758,015	\$3,789,612

8.0 CONCLUSIONS AND RECOMMENDATIONS

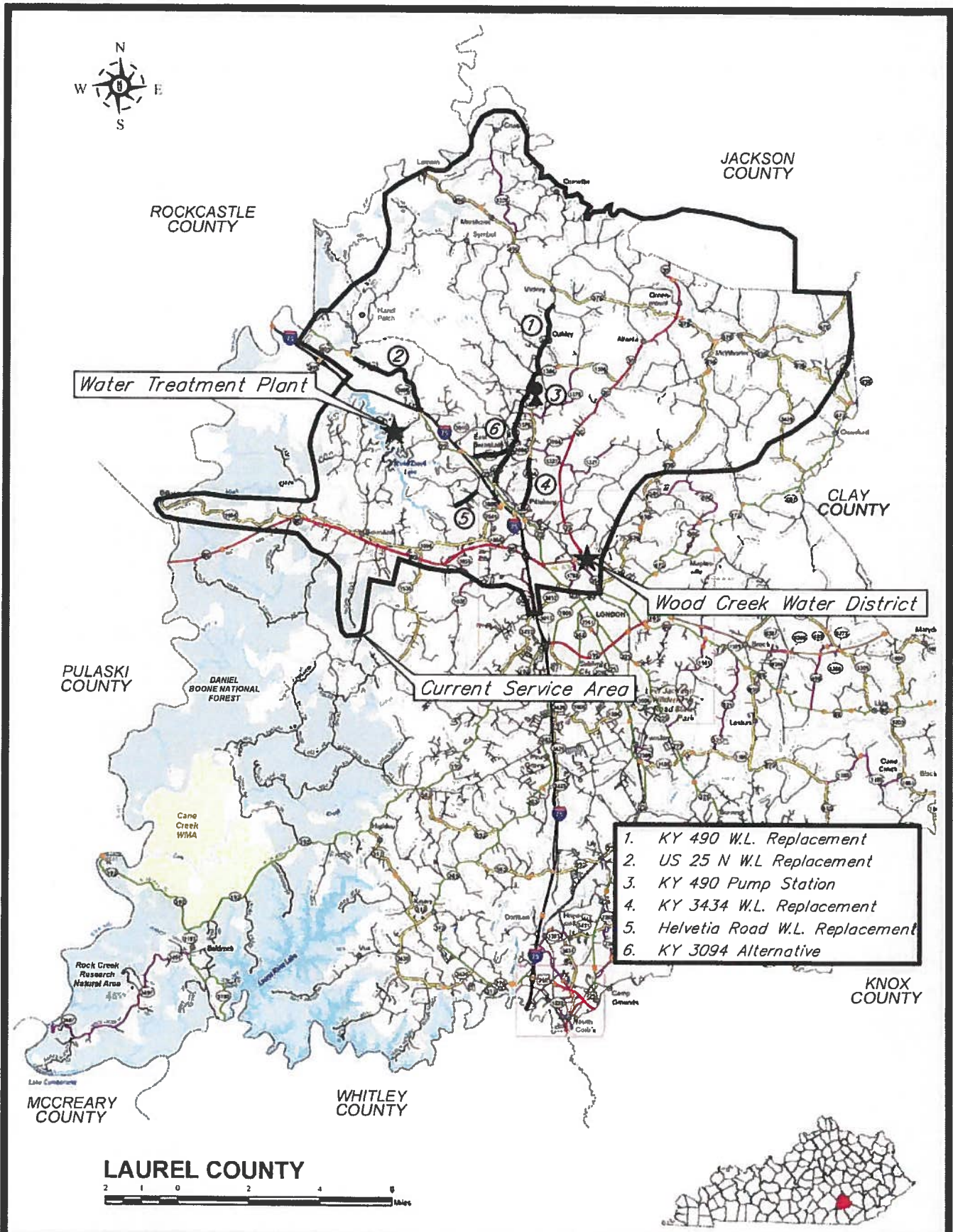
It is the conclusion and recommendation of this report that the Wood Creek Water District implement the project as described in the Proposed Project section of this report. It is further recommended that WCWD proceed with its applications for project funding assistance.

An evaluation of the revenue needed for the proposed project was conducted to determine the project's impact on the water rates. The evaluation of estimated user rate impact can be found in Figure 6 of the Appendix. Based on the evaluation of the revenue needed for debt repayment from the proposed project, the user rates will need to be increased 9.06% to finance the proposed project.

As mentioned in a previous section of this Report, a Summary Addendum to Preliminary Engineering Report will be completed at a later date. This document will outline the project feasibility, and determine the final rate increase needed based on more in-depth analysis of the utility's most recent financial statements.

APPENDIX

FIGURE 1



Water Treatment Plant

Wood Creek Water District

Current Service Area

- 1. KY 490 W.L. Replacement
- 2. US 25 N W.L. Replacement
- 3. KY 490 Pump Station
- 4. KY 3434 W.L. Replacement
- 5. Helvetia Road W.L. Replacement
- 6. KY 3094 Alternative

LAUREL COUNTY
2 1 0 2 4 6
Miles



KENVIRONS, INC.
FRANKFORT, KENTUCKY

FIGURE 1
WOOD CREEK WATER DISTRICT
LOCATION MAP

FIGURE 2

Figure 2
Laurel County, KY - Projections for Population & Water Usage

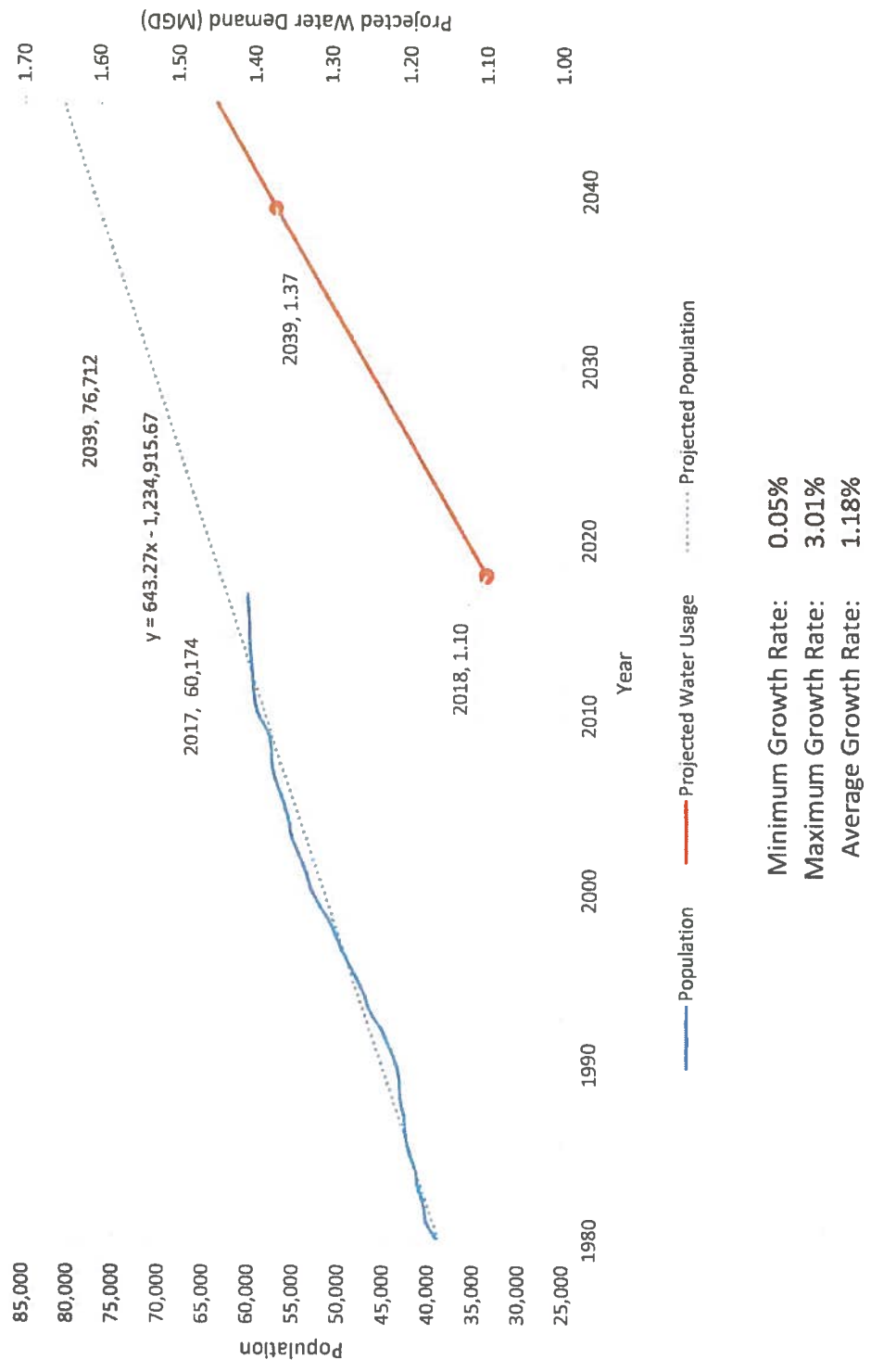


FIGURE 3

WOOD CREEK WATER DISTRICT
Existing Operating Budget
For Year Ending 2017

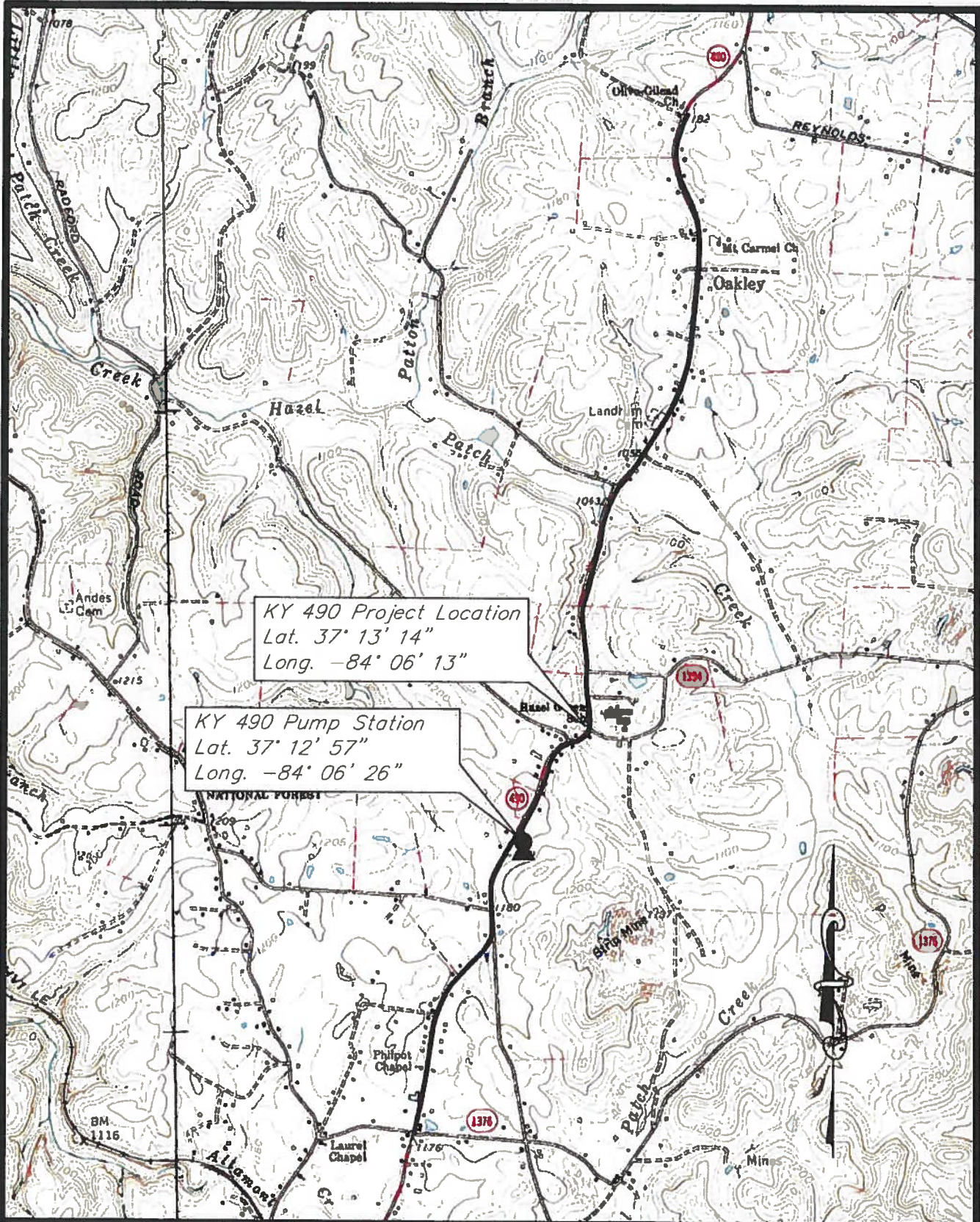
REVENUE REQUIREMENTS

Operation & Maintenance Expenses			
Purchased Water and Power	\$	328,593.00	
Water Treatment	\$	1,417,226.00	
Transmission and Distribution	\$	1,123,816.00	
Administration of Customer Accounts	\$	371,389.00	
Administration and General	\$	514,021.00	
Pension Expense	\$	-	
Amortization	\$	2,970.00	
			\$ 3,758,015.00
Debt Service			
Annual Principal & Interest	\$	1,116,148.00	
			\$ 1,116,148.00
Debt Service Coverage, Reserve, & Service Fees RD	\$	41,750.00	
			\$ 41,750.00
Other			
Short-Term Assets	\$	-	
			\$ -
TOTAL REVENUE REQUIREMENTS			\$ 4,915,913.00

UTILITY INCOME

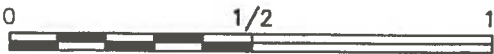
Operating Revenues			
Water Sales	\$	5,567,319.00	
Penalties and Service Charges	\$	132,299.00	
Tap-On Fees	\$	40,890.00	
Other Operating Income	\$	2,500.00	
			\$ 5,743,008.00
Non-Operating Revenues (Expenses)			
Interest Income	\$	3,788.00	
Federal and State Grants	\$	15,555.00	
Gain on Disposal of Equipment	\$	16,745.00	
Miscellaneous	\$	(11,936.00)	
			\$ 24,152.00
TOTAL UTILITY INCOME			\$ 5,767,160.00

FIGURE 4



LONDON, KY. QUADRANGLE

SCALE IN MILES



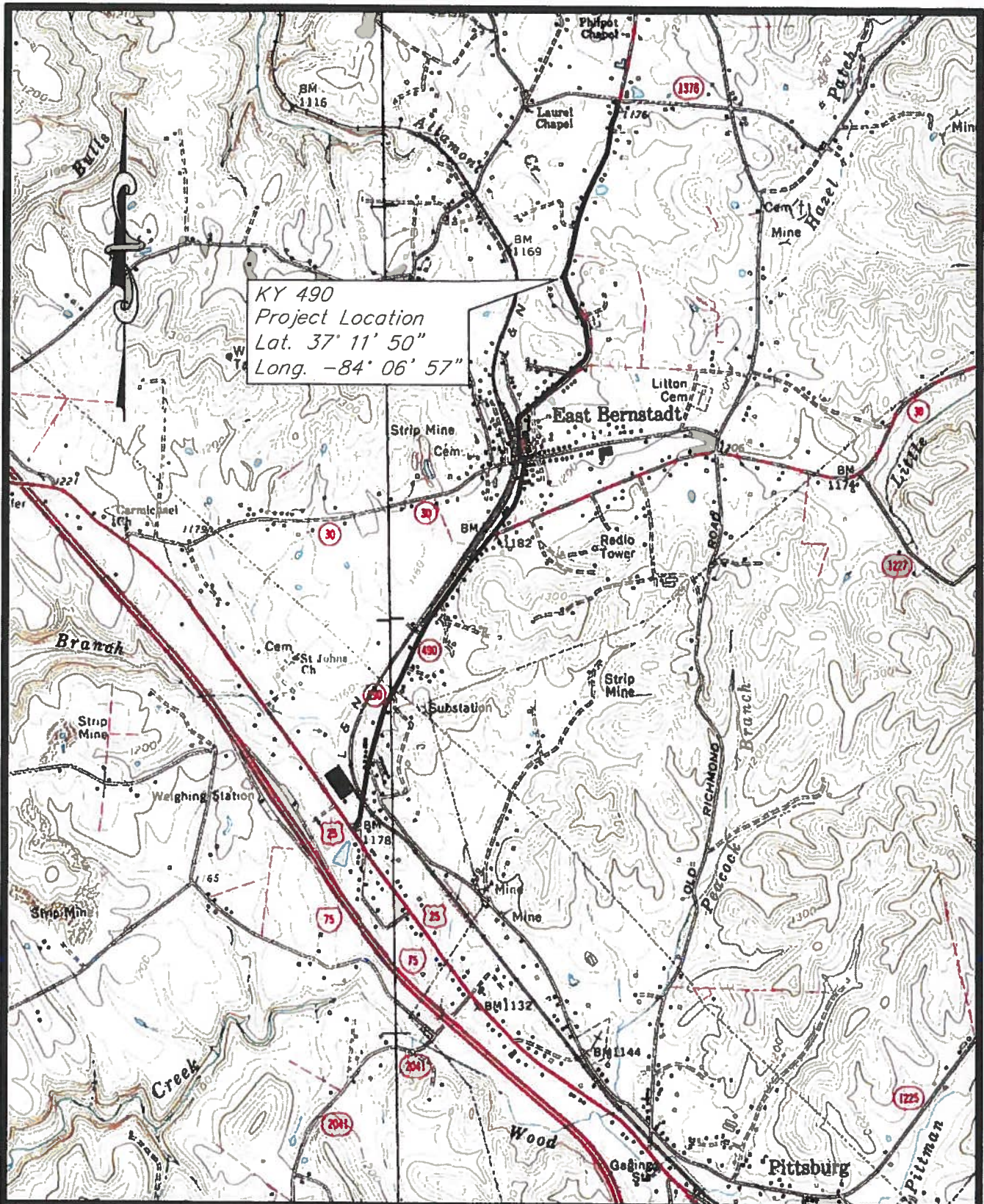
SCALE: 1"=2,000'

**WOOD CREEK WATER DISTRICT
 KY 490 WATERLINE REPLACEMENT
 LAUREL COUNTY, KENTUCKY**



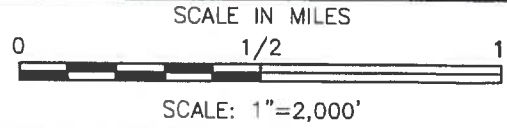
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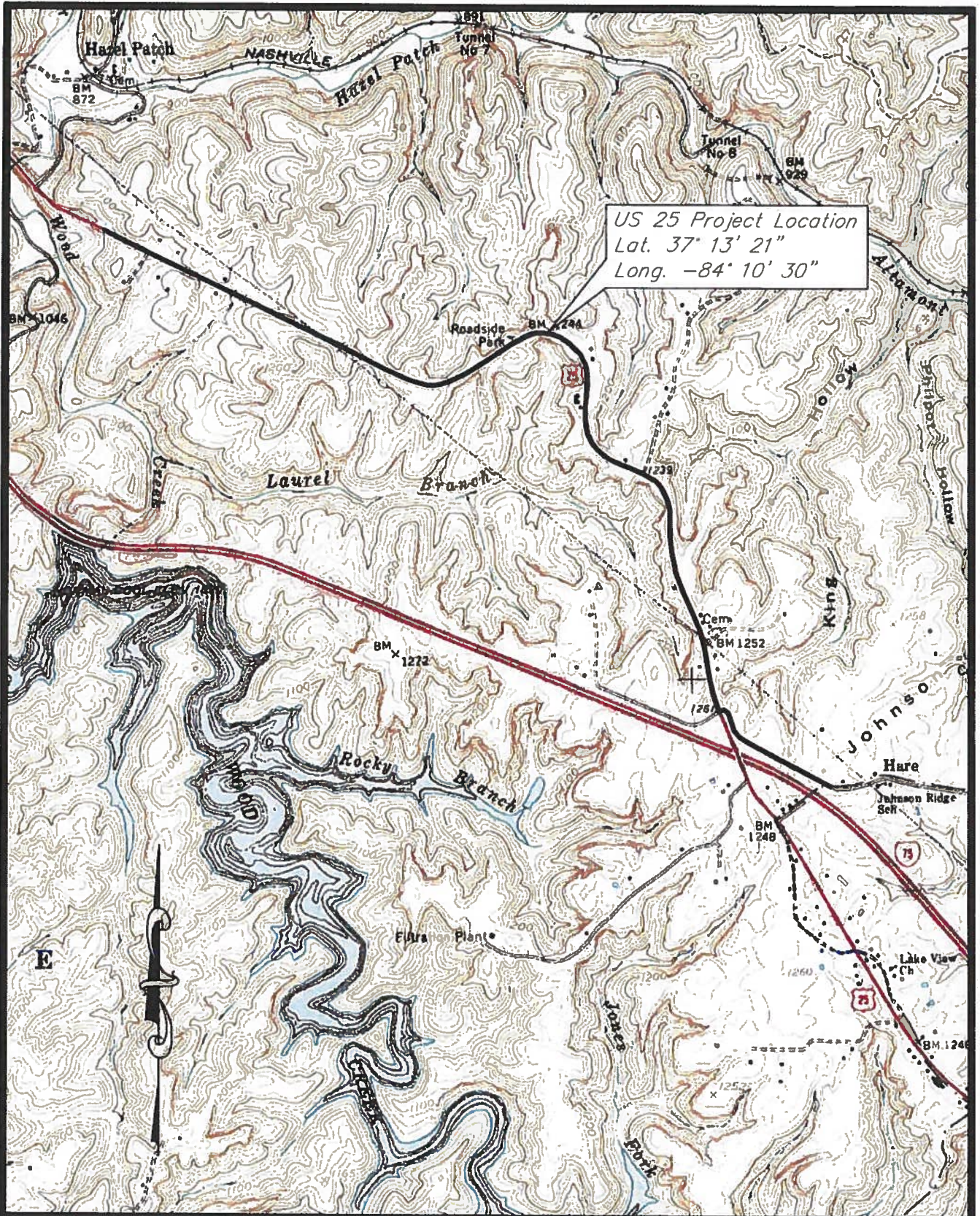


BERNSTADT & LONDON, KY. QUADRANGLES

WOOD CREEK WATER DISTRICT
KY 490 WATERLINE REPLACEMENT (CONT.)
LAUREL COUNTY, KENTUCKY

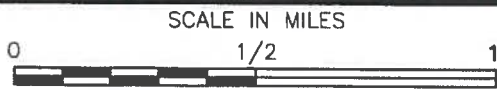


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BERNSTADT, KY. QUADRANGLE

**WOOD CREEK WATER DISTRICT
US 25 WATERLINE REPLACEMENT
LAUREL COUNTY, KENTUCKY**

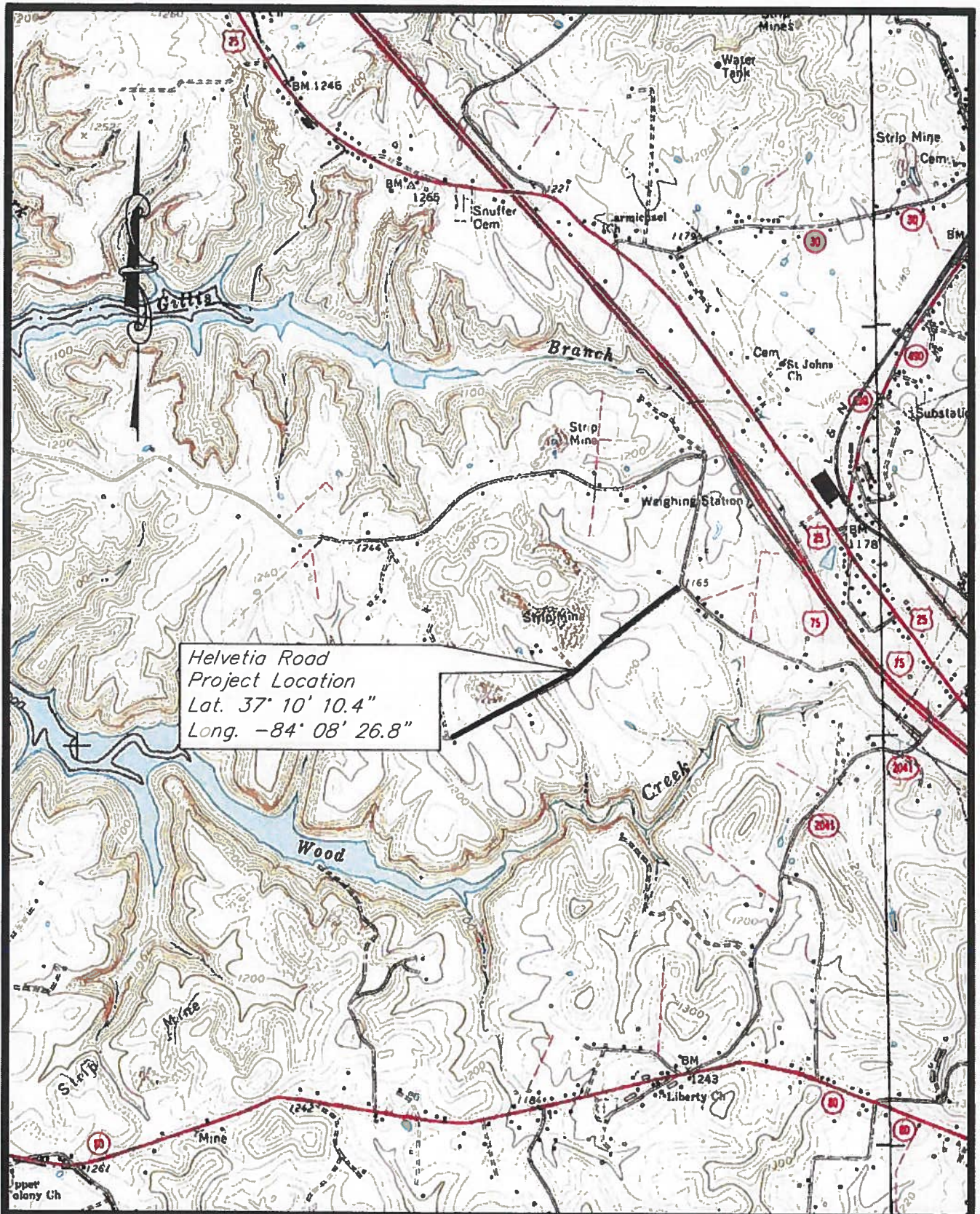


SCALE: 1"=2,000'



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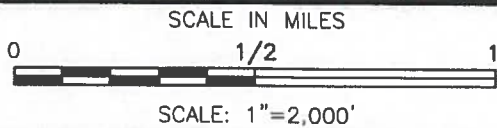
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(502) 895-4357



Helvetia Road
 Project Location
 Lat. 37° 10' 10.4"
 Long. -84° 08' 26.8"

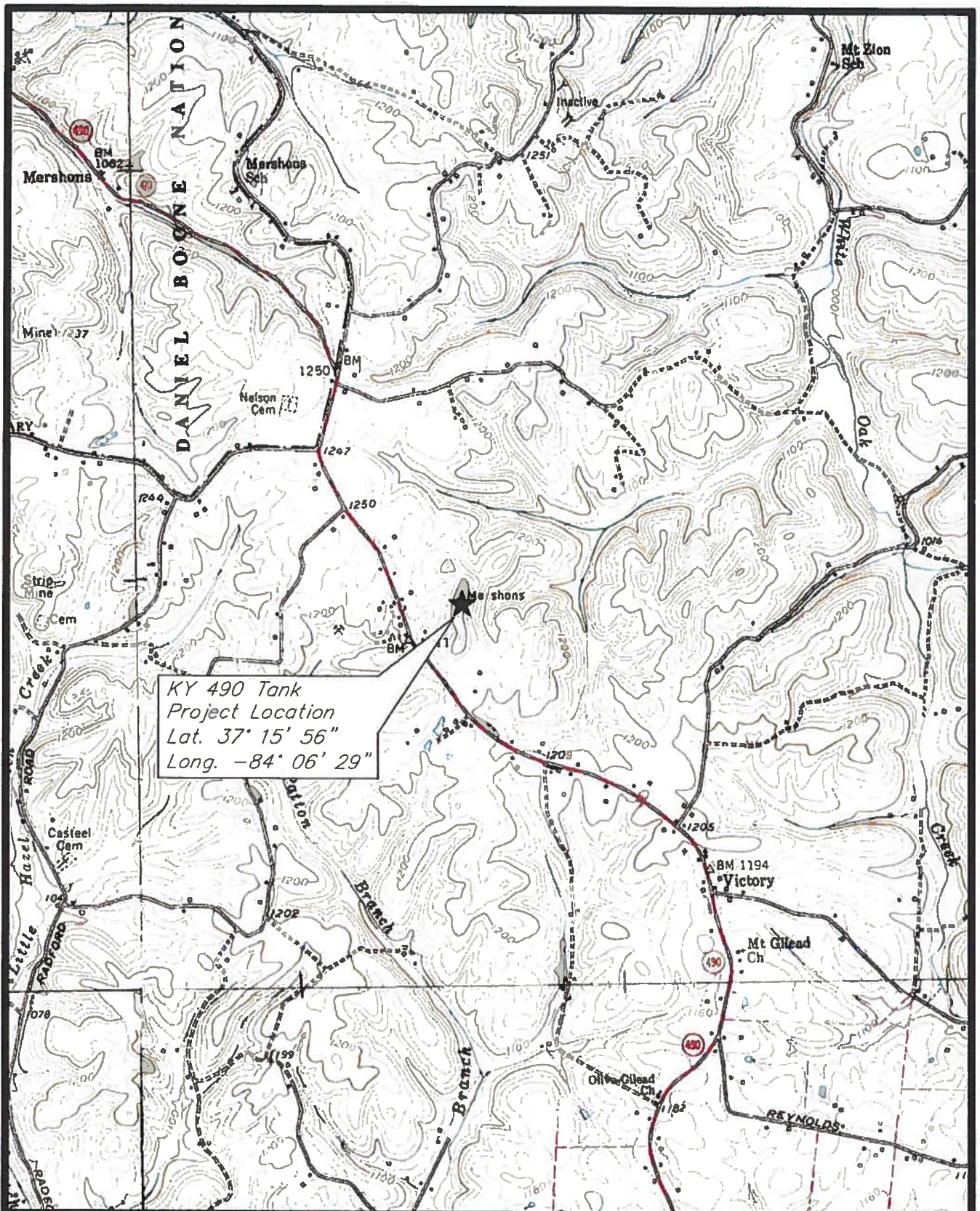
BERNSTADT & LONDON, KY. QUADRANGLES

**WOOD CREEK WATER DISTRICT
 HELVETIA RD. WATERLINE REPLACEMENT
 LAUREL COUNTY, KENTUCKY**



KENVIRONS, INC.

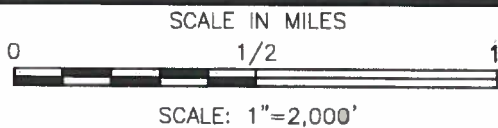
452 VERSAILLES ROAD, FRANKFORT, KENTUCKY
 (502) 695-4357



KY 490 Tank
 Project Location
 Lat. 37° 15' 56"
 Long. -84° 06' 29"

LIVINGSTON & PARROT, KY. QUADRANGLES

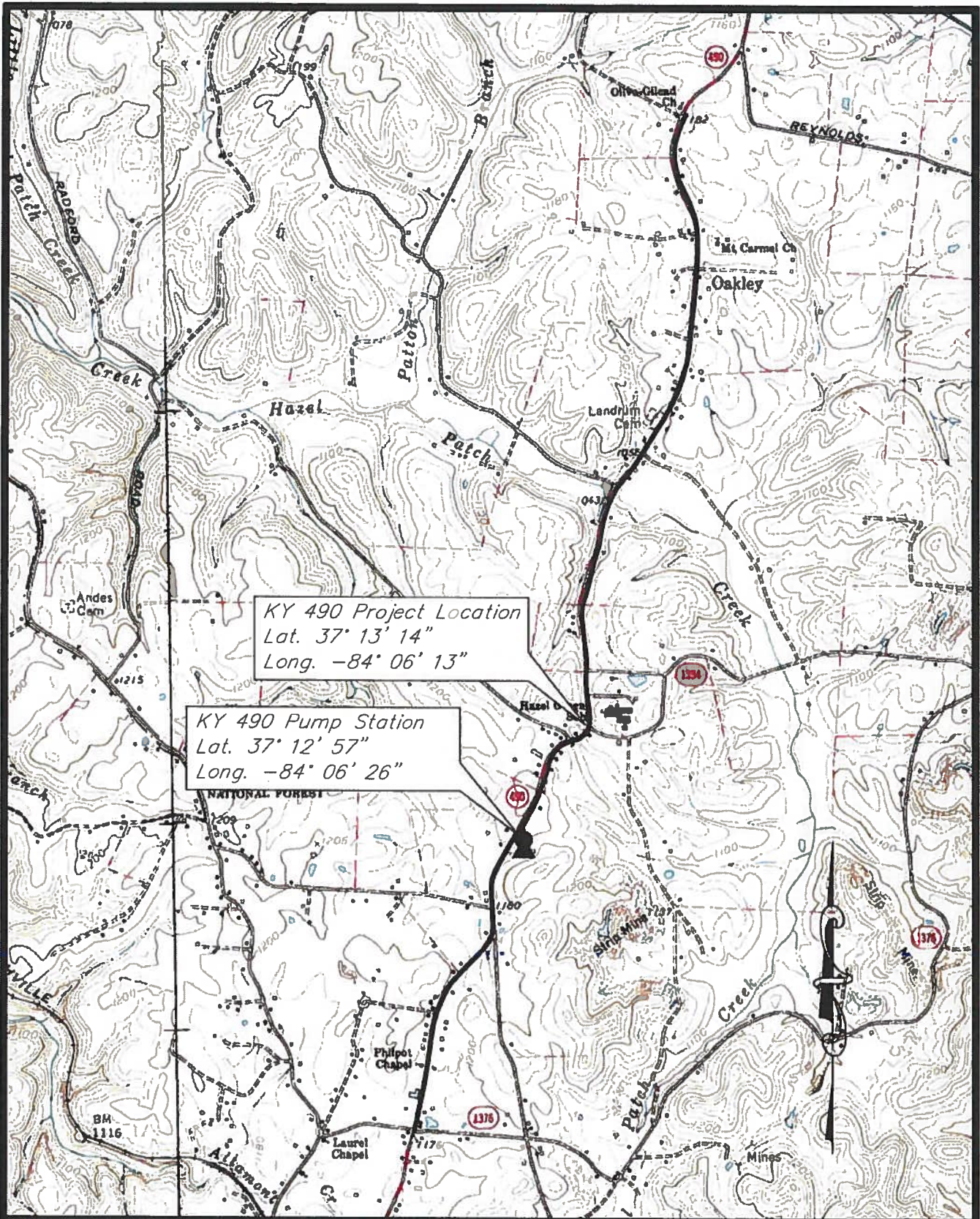
**WOOD CREEK WATER DISTRICT
 KY 490 TANK PAINTING
 LAUREL COUNTY, KENTUCKY**



KENVIRONS, INC.

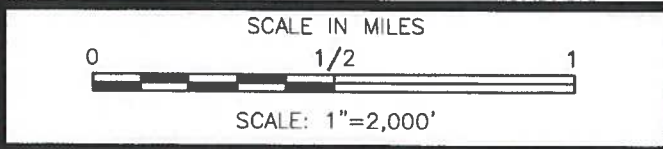
452 VERSAILLES ROAD, FRANKFORT, KENTUCKY
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FIGURE 5

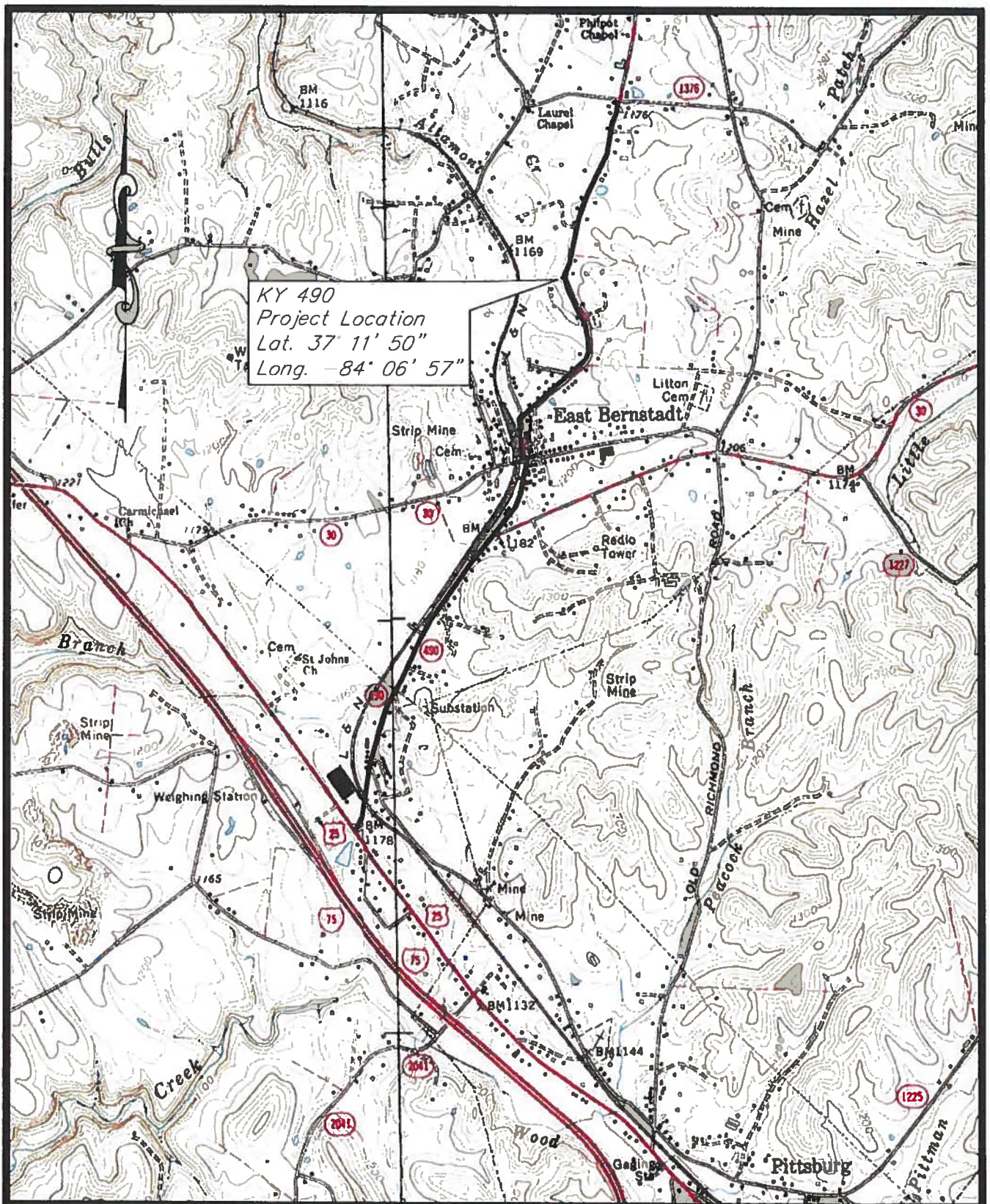


LONDON, KY. QUADRANGLE

WOOD CREEK WATER DISTRICT
 KY 490 WATERLINE REPLACEMENT
 LAUREL COUNTY, KENTUCKY

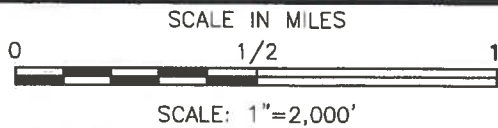



KENVIRONS, INC.
 452 VERSAILLES ROAD, FRANKFORT, KENTUCKY
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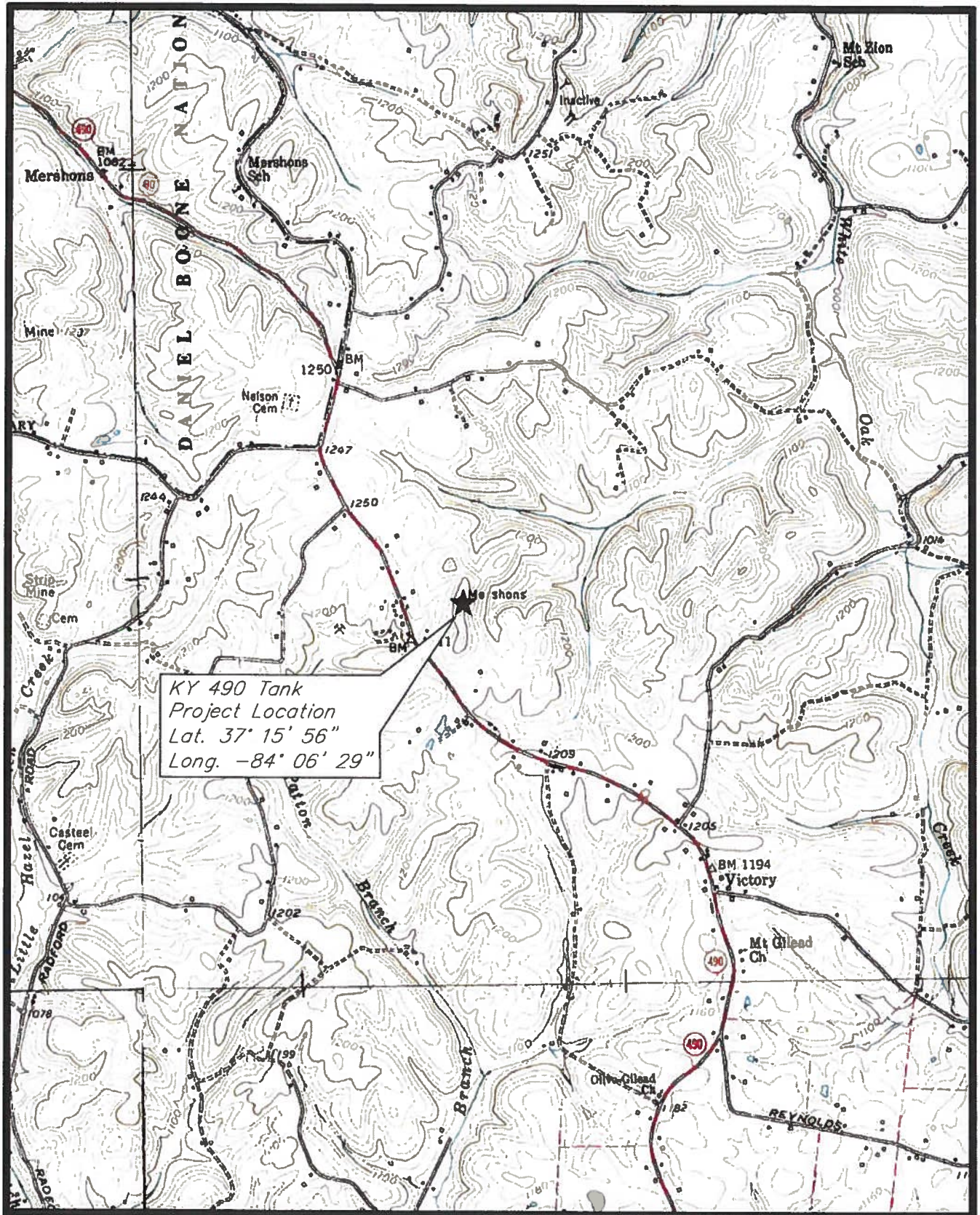


BERNSTADT & LONDON, KY. QUADRANGLES

WOOD CREEK WATER DISTRICT
 KY 490 WATERLINE REPLACEMENT (CONT.)
 LAUREL COUNTY, KENTUCKY

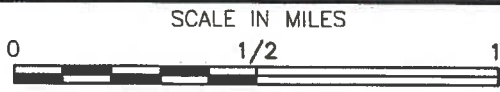


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KY 490 Tank
 Project Location
 Lat. 37° 15' 56"
 Long. -84° 06' 29"

LIVINGSTON & PARROT, KY. QUADRANGLES



WOOD CREEK WATER DISTRICT
 KY 490 TANK PAINTING
 LAUREL COUNTY, KENTUCKY



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FIGURE 6

Wood Creek Water District
Alternative #1 (Water System Improvements)
Opinion of Probable Cost

October 9, 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Item Price
1	2" PVC SDR-17 Pipe	LF	240	\$10.00	\$2,400.00
2	3" PVC SDR-17 Pipe	LF	180	12.00	\$2,160.00
3	4" PVC SDR-17 Pipe	LF	200	15.00	\$3,000.00
4	6" PVC SDR-17 Pipe	LF	4,230	20.00	\$84,600.00
5	8" PVC SDR-17 Pipe	LF	42,650	25.00	\$1,066,250.00
6	8" D.I., CL 350 Pipe w/ Nitrile Gaskets	LF	1,200	35.00	\$42,000.00
7	Bored Steel Encasement for 8" Pipe	LF	390	180.00	\$70,200.00
8	Bored Steel Encasement for 6" Pipe	LF	80	160.00	\$12,800.00
9	Bored Steel Encasement for 4" Pipe	LF	80	130.00	\$10,400.00
10	Bored Steel Encasement for 3" Pipe	LF	120	120.00	\$14,400.00
11	Open Cut Steel Encasement for 8" Pipe	LF	70	150.00	\$10,500.00
12	Open Cut Steel Encasement for 6" Pipe	LF	70	140.00	\$9,800.00
13	8" Gate Valve	EA	14	1,500.00	\$21,000.00
14	6" Gate Valve	EA	4	1,200.00	\$4,800.00
15	4" Gate Valve	EA	2	1,000.00	\$2,000.00
16	3" Gate Valve	EA	6	800.00	\$4,800.00
17	2" Gate Valve	EA	12	700.00	\$8,400.00
18	Leak Detection Meter	EA	2	1,000.00	\$2,000.00
19	10" x 8" Tie-In	EA	1	2,200.00	\$2,200.00
20	8" x 8" Tie-In	EA	1	2,000.00	\$2,000.00
21	8" x 6" Tie-In	EA	3	1,800.00	\$5,400.00
22	8" x 4" Tie-In	EA	2	1,500.00	\$3,000.00
23	8" x 3" Tie-In	EA	3	1,200.00	\$3,600.00
24	8" x 2" Tie-In	EA	12	1,000.00	\$12,000.00
25	6" x 3" Tie-In	EA	3	1,200.00	\$3,600.00
26	24" x 8" Tapping Sleeve & Valve	EA	1	10,000.00	\$10,000.00
27	20" x 6" Tapping Sleeve & Valve	EA	1	9,000.00	\$9,000.00
28	10" x 8" Tapping Sleeve & Valve	EA	1	5,500.00	\$5,500.00
29	8" x 8" Tapping Sleeve & Valve	EA	1	5,000.00	\$5,000.00
30	8" x 6" Tapping Sleeve & Valve	EA	1	5,000.00	\$5,000.00
31	Directional Drill No. 1	LS	1	30,000.00	\$30,000.00
32	Directional Drill No. 2	LS	1	15,000.00	\$15,000.00
33	Fire Hydrant	EA	23	5,000.00	\$115,000.00
34	Air Release Valve Assembly	EA	3	2,000.00	\$6,000.00
35	Cut & Cap Existing Waterline	EA	4	1,000.00	\$4,000.00
36	Automatic Read Meters	EA	4,025	150.00	\$603,750.00
37	KY 490 Booster Pump Station	LS	1	170,000.00	\$170,000.00
38	Repaint Existing 200,000 Gallon WST	LS	1	300,000.00	\$300,000.00
39	Telemetry	LS	1	20,000.00	\$20,000.00
40	3/4" Service Tubing	LF	10,800	6.00	\$64,800.00
41	Meter Reconnect	EA	180	200.00	\$36,000.00
42	Free Bore	LF	2,000	30.00	\$60,000.00
43	Pavement Replacement				
43a	Crushed Stone (Driveways)	LF	1,625	12.00	\$19,500.00
43b	Light Duty Bituminous Pavement Replacement	LF	150	30.00	\$4,500.00
Total Construction Cost					\$2,886,360.00

Summary of Costs for Alternative #1

Construction Cost	\$2,886,360.00
Contingency	288,920.00
Engineering Design @ 7.08%	244,600.00
Resident Inspection @ 4.49%	101,120.00
Environmental	20,000.00
Preliminary Engineering Report	15,000.00
Local Counsel	8,000.00
Bond Counsel	22,000.00
Land & Rights	10,000.00
Capitalized Interest	82,000.00
TOTAL PROJECT COST	3,678,000.00

Estimated User Rate Impact Alternative #1 (Water System Improvements)

FUNDING:

RD Loan (80%)	\$2,942,000.00
RD Grant (20%)	\$736,000.00
TOTAL PROJECT FUNDING	\$3,678,000.00

REVENUE REQUIREMENT:

RD Annual Principal & Interest Payment	\$114,744
Loan Coverage @ 10%	\$11,474
Depreciation/Short Lived Assets	\$73,550
Total Annual Expense	\$199,769

Number of Existing Customers	5,200
Additional Revenue Per Bill	\$3.20

	Current Rates	Proposed Rates
First 2,000 Gallons	\$24.22	\$27.42
Next 1,500 Gallons	\$7.70	\$7.70
Next 1,500 Gallons	\$6.87	\$6.87
Next 1,500 Gallons	\$5.78	\$5.78
All Over 7,500 Gallons	\$4.57	\$4.57
Cost for 4,000 gallons	\$35.36	\$38.56
	Percent Increase	9.06%

FIGURE 7

Wood Creek Water District
Alternative #2 (KY 490 Waterline and P.S. Replacement)

Opinion of Probable Cost

October 9, 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Item Price
1	8" D.I., CL 350 Pipe w/ Nitrile Gaskets	LF	200	\$35.00	\$7,000.00
2	8" PVC SDR-17 Pipe	LF	16,500	25.00	\$412,500.00
3	Bored Steel Encasement for 8" Pipe	LF	40	180.00	7,200.00
4	Open Cut Steel Encasement for 8" Pipe	LF	40	150.00	6,000.00
5	8" Gate Valve	EA	9	1,500.00	13,500.00
6	Leak Detection Meter	EA	1	1,000.00	1,000.00
7	24" x 8" Tapping Sleeve & Valve	EA	1	10,000.00	10,000.00
8	8" x 6" Tapping Sleeve & Valve	EA	1	5,000.00	5,000.00
9	Directional Drill No. 1	LS	1	30,000.00	30,000.00
10	Fire Hydrant	EA	8	5,000.00	40,000.00
11	Air Release Valve Assembly	EA	2	2,000.00	4,000.00
12	Automatic Read Meters	EA	4,025	150.00	\$603,750.00
13	KY 490 Booster Pump Station	LS	1	170,000.00	170,000.00
14	Repaint Existing 200,000 Gallon WST	LS	1	300,000.00	300,000.00
15	Telemetry	LS	1	20,000.00	20,000.00
16	Free Bore	LF	450	30.00	13,500.00
17	Pavement Replacement				
17a	Crushed Stone (Driveways)	LF	175	12.00	2,100.00
17b	Light Duty Bituminous Pavement Replacement	LF	100	30.00	3,000.00
Total Construction Cost					\$1,648,550.00

Contingency	165,050.00
Engineering Design	132,700.00
Resident Inspection	57,700.00
Environmental	20,000.00
Preliminary Engineering Report	10,000.00
Local Counsel	6,000.00
Bond Counsel	17,000.00
Land & Rights	10,000.00
Capitalized Interest	43,000.00
TOTAL PROJECT COST	2,110,000.00

Estimated User Rate Impact

Alternative #2 (KY 490 Waterline and P.S. Replacement)

FUNDING:

RD Loan (80%)	\$1,688,000.00
RD Grant (20%)	\$422,000.00
TOTAL PROJECT FUNDING	\$2,110,000.00

REVENUE REQUIREMENT:

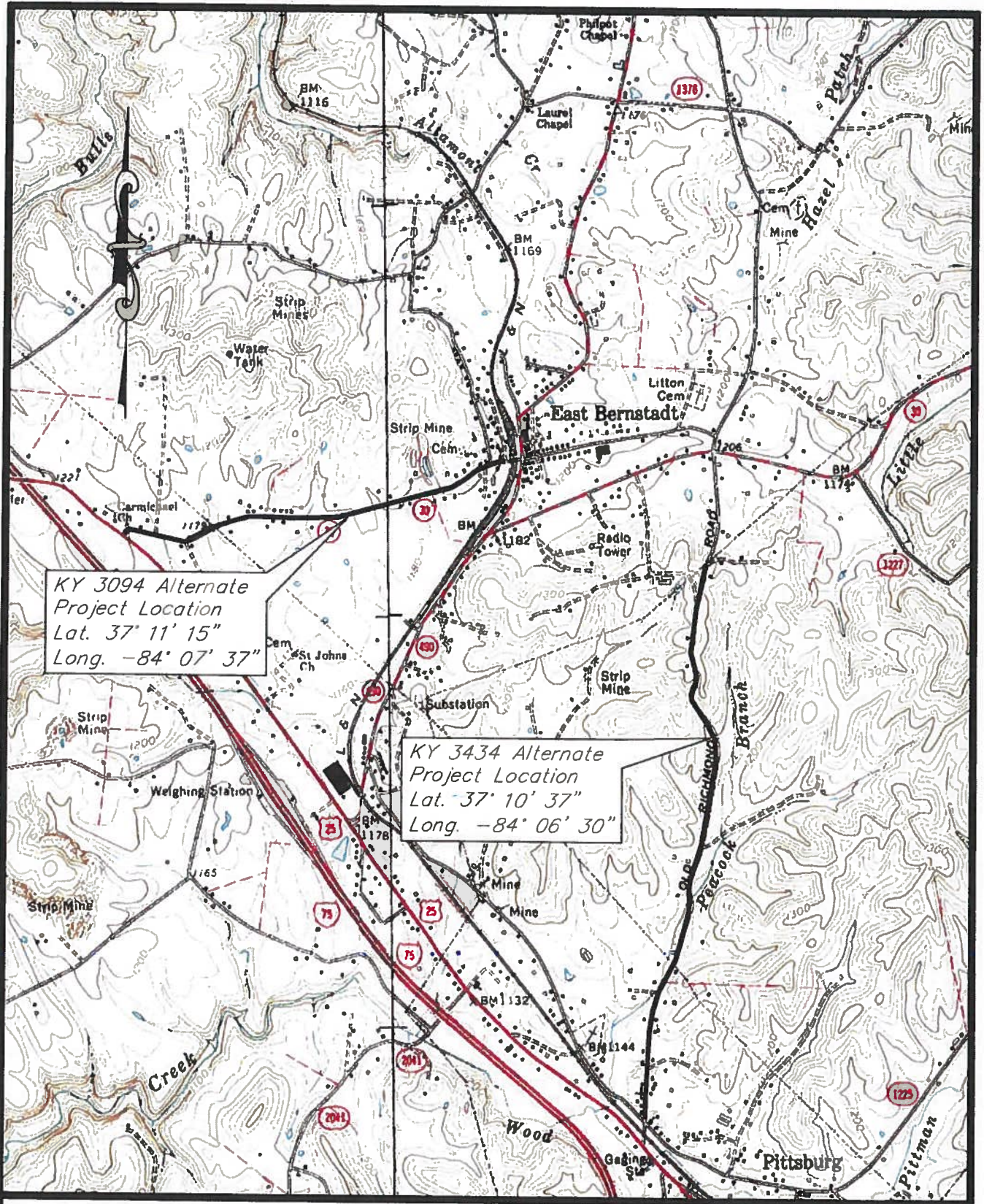
RD Annual Principal & Interest Payment	\$65,836
Loan Coverage @ 10%	\$6,584
Depreciation/Short Lived Assets	\$42,200
Total Annual Expense	\$114,619

Number of Existing Customers	5,200
Additional Revenue Per Bill	\$1.84

	Current Rates	Proposed Rates
First 2,000 Gallons	\$24.22	\$26.06
Next 1,500 Gallons	\$7.70	\$7.70
Next 1,500 Gallons	\$6.87	\$6.87
Next 1,500 Gallons	\$5.78	\$5.78
All Over 7,500 Gallons	\$4.57	\$4.57
 Cost for 4,000 gallons	 \$35.36	 \$37.19
	Percent Increase	5.20%

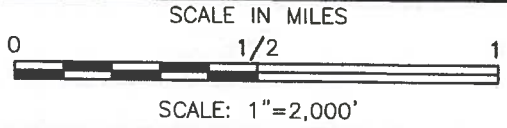
FIGURE 8


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WOOD CREEK WATER DISTRICT
FIGURE 8: KY 3434 ALTERNATE & KY 3094 ALTERNATE
LAUREL COUNTY, KENTUCKY



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