

**PRELIMINARY ENGINEERING REPORT  
FOR THE  
LAUREL COUNTY WATER DISTRICT #2**

**SOUTH LAUREL  
WATER SYSTEM IMPROVEMENTS**

**AUGUST 2017**



**PRELIMINARY ENGINEERING REPORT  
SOUTH LAUREL WATER SYSTEM IMPROVEMENTS  
LAUREL COUNTY WATER DISTRICT #2  
LAUREL COUNTY, KENTUCKY**

I. GENERAL

This Preliminary Engineering Report is intended to analyze the proposed water system improvements which are being planned by the Laurel County Water District #2. The proposed project will upgrade, replace, and/or supplement various aging, undersized, and inadequate infrastructure components throughout the District's water distribution system.

Specifically, the proposed project consists of various water main interconnections within the distribution system from the Dorthae community to just south of the Cumberland Gap Parkway. The improvements will allow the District to eliminate an existing 14-inch cast iron water line that lies directly adjacent to the CSX railroad. In addition, a new elevated water storage tank will be constructed in the Hopewell community.

Rural Development "Kentucky Guide 7A" will be submitted at a later date and will serve as the Summary Addendum to this report. The Summary Addendum will further analyze the capability of the Company to execute this project through an evaluation of its financial standing and overall system operation.

II. PROJECT PLANNING AREA

The areas to be affected by construction will generally lie adjacent to existing transportation routes. All new water mains will be installed on county road rights-of-way or on utility easements granted to the District. The topography of these areas is generally flat, but does vary to gently rolling hills. The land use is mainly agricultural with intermittent areas of dense residential and commercial development. Both the topography and land use within the project area are typical for this region of Kentucky.

All areas included in the project have experienced significant growth since the water system was first developed over fifty years ago. For the majority of the project area, there are no major commercial or industrial businesses expected in the next decade. However, due to its close proximity to the I-65 corridor, lying between the cities of London and Corbin, it is anticipated that sustained residential and commercial growth will continue within the system going forward. Implementation of the project will have a direct and substantial impact on those customers currently served by proposed infrastructure upgrades.

Attached as a part of this report are location and topographic maps which depict the water main route and proposed connection points to existing system mains. The location of the proposed water storage tank and other major appurtenances proposed as part of this project are also shown.

### III. EXISTING FACILITIES

The Laurel County Water District #2 owns and operates a water treatment and distribution system which serves the rural population of south central Laurel and north western Knox Counties. The District operates and maintains the water system through a Board of Commissioners, a General Manager, as well as office and field personnel. The Board of Commissioners consists of a chairperson and four commissioners, all of which are appointed by the Laurel County Fiscal Court.

The District produces the vast majority of the systems potable water at its own treatment facility, however it does purchase a small amount of wholesale water for resale from the London Utility Commission. The combination of which has sufficient capacity to serve the Company's approximately 6,000 existing residential, commercial and industrial customers.

The District's water treatment plant is located in the approximate center of the distribution system, near the community of Hopewell. The facility has a rated treatment capacity of 2.88 MGD and is currently operating at approximately 50% of that capacity producing 1.46 MGD on average. The treatment plant is a conventional surface water filtration facility, consisting of a raw water intake & pumping structure, flash mix, settling basins, multi-media filters, chemical disinfection, clearwell storage, and finished water pumping facilities. The primary water source is the Laurel River Lake, which generally yields high quality raw water and is of abundant capacity.

The water distribution system consists of a network of water supply and distribution mains along with a series of water tanks and booster pump stations. This includes various sized water lines ranging from 2-inch to 16-inch, three pumps stations, and three water storage tanks with a rated capacity of 1,700,000 gallons. The majority of the system has been in place for less than 50 years. Pipe material within the system consists of cast iron and asbestos cement for the older lines along with ductile iron and plastic for the newer ones. Water loss within the system is generally maintained at acceptable levels, with an average annual loss of about 15%.

Information regarding the current rate structure, annual operating and maintenance data, a tabulation of monthly users and revenue, and a list of the outstanding bonds can be found in the Summary Addendum which will be submitted at a later date.

### IV. NEED FOR THE PROJECT

The projects primary objective is to upgrade, replace, and/or supplement various aging, undersized, and/or inadequate infrastructure located in various areas throughout the District's water distribution system. The improvements will ensure that the system can meet the demands of existing and future customers in safe and efficient manner.

When the District was first formed, they purchased an existing 14-inch cast iron water main and other associated appurtenances from the L&N Railroad. This existing main runs along the gravel shoulder of the rail bed and was used in the early 1900's to fill steam

locomotives with non-potable water. The line was later converted for use as potable water main. Currently, this line serves as a major north-south transmission main within the District's system. In addition to being very old, the existing line is located directly adjacent to the rail bed which makes it virtually impossible for District personnel to safely repair and maintain. In most areas, the line is inaccessible for conventional repair methods and all excavation must be done by hand. Given the great significance of this transmission main within the distribution system, the current situation represents a substantial risk to systems overall integrity and reliability.

The majority of the District's service area is supplied via storage tanks in the Lilly community (500,000 gallons) and Oak Ridge Church area (1,000,000 gallons). The existing interior and coating systems on these tanks have reached the end of their useful lives. Accordingly, both tanks are in need of complete rehabilitations which will require them to be taken out of service for several months. The construction of the new tank in the Hopewell community will allow the District to maintain service while the existing tanks are rehabilitated. Following completion on the tank rehabilitations, the increased storage capacity will allow the District to facilitate future demand growth within the service area.

## V. ALTERNATIVES CONSIDERED

Based on the continued need to provided reliable potable water service and also need to accommodate growth within the project area, the Laurel County Water District #2 must take the necessary steps to continue to provide service as required by the Kentucky Division of Water and the Kentucky Public Service Commission. The final project scope determination was centered on meeting existing and future customer demands without significantly burdening the District's ability to meet its current and future financial obligations. Accordingly, viable project alternatives were limited and focused largely on determining the most efficient route and location of the proposed interconnections and the overall capacity and location of the proposed water storage tank.

All other alternatives explored would have only served to increase the scope of the project beyond that which is being proposed herein. The primary additive alternate considered was the inclusion of an additional 12-inch interconnection extending from the intersection of Kentucky Highway 3431 (American Greeting Card Road) and Hillcrest Rehabilitation Center Drive to the intersection of US Highway 25E (Cumberland Gap Parkway) and the CSX Rail line. This addition would have allow the District to maintain fire flows similar to those currently provided by the existing 14" line which is being eliminated through the project.

Additional additive alternatives considered included the replacement of aging and undersized lines located within the Park Hills and Tom Town Road area of the system, the replacement of aging asbestos cement water line on Kentucky Highway 1006 in the northern portion of the system, and complete rehabilitations to the existing water storage located in the Lilly and Oak Ridge communities. Similar to the proposed project, these additional improvements would have rehabilitated and/or replaced various inadequate infrastructure components which are currently relied upon within the system.

It was determined that this additional work should be delayed so to decrease the debt service impact of project. However, all or a portion may be completed if the as-bid construction cost of the project are less than anticipated herein.

The alternatives described above and others were evaluated based on several factors. They included: the needs of each service area; the total project costs; the topography and location of exiting water main routes; the availability of water main rights-of-way; and the future cost of maintaining the existing system and proposed improvements.

## VI. PROPOSED PROJECT

In order to correct the above-described deficiencies, the project proposes the installation of approximately 2,600 LF of 8-inch water line, 5,100 LF of 6-inch water line, and 2,700 LF of new 4-inch water line to interconnect the water system from the Dorthae community to just south of the Cumberland Gap Parkway. The improvements will allow the District to eliminate an existing 14-inch cast iron water line that lies directly adjacent to the CSX railroad.

In addition, a new 500,000 gallon elevated water storage tank will be constructed in Hopewell community. The new tank will be built on an existing site owned by the District where a storage tank formerly stood. The existing tank was demolished several years ago due to its poor condition and inadequate overflow elevation.

An itemized cost estimate is included in this report and outlines all of the individual construction items along with their associated estimated unit costs. A summary cost estimate recaps all of the project costs and outlines the funding scheme for the project, is also included in this report. The total cost of the expansion and improvements is estimated to be \$2,350,000 with full funding to be provided by USDA Rural Development loan and grant funds.

## VII. CONCLUSIONS AND RECOMMENDATIONS

Based on the need to continue to supply the existing and future customers with a sufficient and dependable potable water supply, it is recommended that the Laurel County Water District #2 pursue the financial assistance as outlined herein so that the proposed project can be implemented as soon as possible.



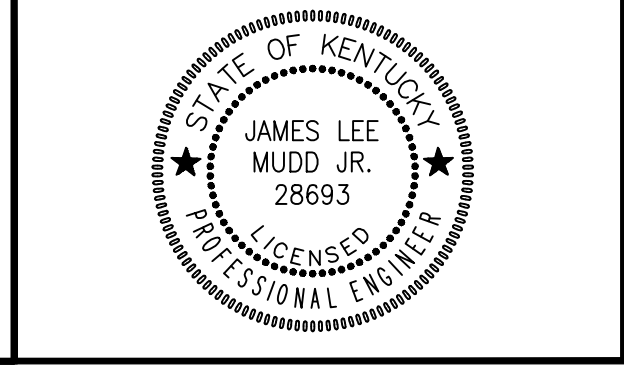
**Monarch Engineering, Inc.**  
 556 CARLTON DRIVE  
 LAWRENCEBURG, KY 40342

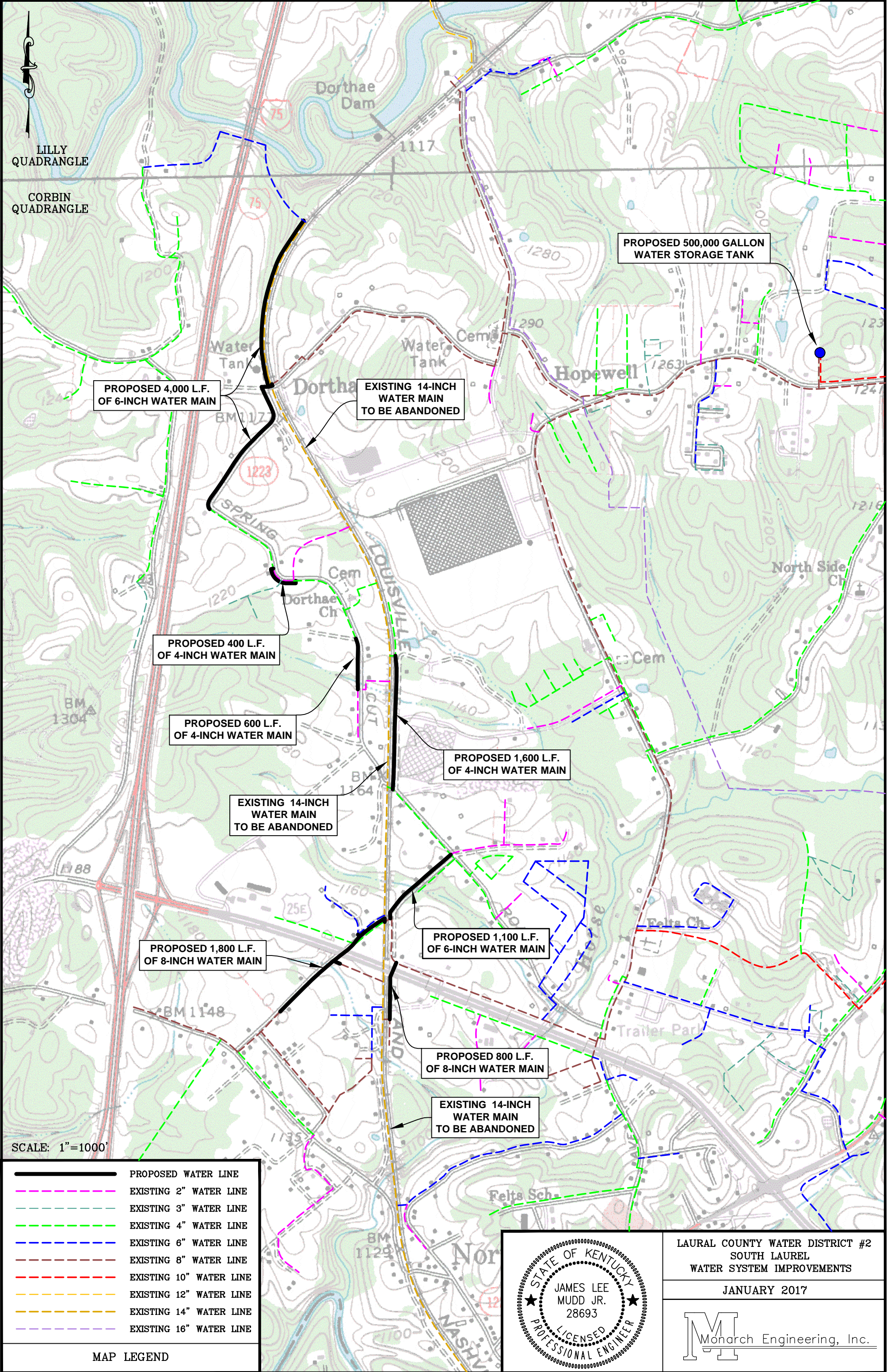
DESCRIPTION: LOCATION MAP  
 SOUTH LAUREL  
 WATER SYSTEM IMPROVEMENTS

CUSTOMER:  
 LAUREL COUNTY WATER DISTRICT #2  
 LAUREL COUNTY, KENTUCKY

PROJECT NO. 1700  
 DATE: AUG 2017  
 DRAWN BY: JLM  
 CHECKED BY: DSB  
 CHECKED BY: DMB  
 SCALE: N.T.S.

SHEET:  
 LM-1

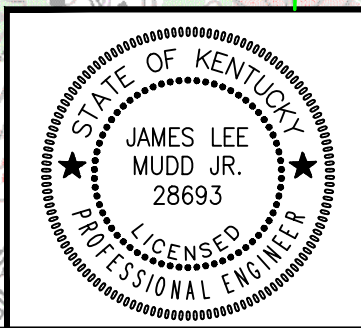




SCALE: 1"=1000'

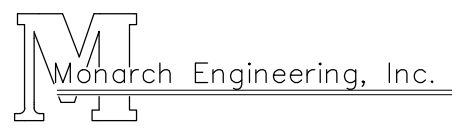
	PROPOSED WATER LINE
	EXISTING 2" WATER LINE
	EXISTING 3" WATER LINE
	EXISTING 4" WATER LINE
	EXISTING 6" WATER LINE
	EXISTING 8" WATER LINE
	EXISTING 10" WATER LINE
	EXISTING 12" WATER LINE
	EXISTING 14" WATER LINE
	EXISTING 16" WATER LINE

MAP LEGEND



LAURAL COUNTY WATER DISTRICT #2  
SOUTH LAUREL  
WATER SYSTEM IMPROVEMENTS

JANUARY 2017



**PRELIMINARY COST ESTIMATE  
SOUTH LAUREL WATER SYSTEM IMPROVEMENTS  
LAUREL COUNTY WATER DISTRICT #2  
JANUARY 2017**

**PROJECT COSTS**

DEVELOPMENT

CONTRACT NO. 1 - 14-INCH RAILROAD WATER LINE ABANDONMENT	\$730,000
CONTRACT NO. 2 - HOPEWELL WATER STORAGE TANK	<u>1,100,000</u>
TOTAL DEVELOPMENT	1,830,000
CONTINGENCY	183,000
ENGINEERING DESIGN	144,000
CONSTRUCTION INSPECTION	87,000
PRELIMINARY ENGINEERING REPORT	10,000
ENVIRONMENTAL ASSESSMENT	10,000
GEOTECHNICAL INVESTIGATION	10,000
ADMINISTRATION	8,000
LEGAL	18,000
LAND & EASEMENT ACQUISITION	15,000
INTEREST	<u>35,000</u>
<b>TOTAL PROJECT COSTS</b>	<b>\$2,350,000</b>

**PROJECT FUNDING**

USDA RURAL DEVELOPMENT LOAN	\$1,645,000
USDA RURAL DEVELOPMENT GRANT	<u>705,000</u>
<b>TOTAL PROJECT FUNDING</b>	<b>\$2,350,000</b>



**PRELIMINARY COST ESTIMATE  
SOUTH LAUREL WATER SYSTEM IMPROVEMENTS  
LAUREL COUNTY WATER DISTRICT #2  
JANURARY 2017**

**CONTRACT NO. 1 - 14-INCH RAILROAD WATER LINE ABANDONMENT**

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	8-Inch PVC SDR-17 Water Line	2,600 LF	35.00	91,000.00
2	6-Inch PVC SDR-17 Water Line	5,100 LF	30.00	153,000.00
3	4-Inch PVC SDR-17 Water Line	2,700 LF	25.00	67,500.00
4	Bore & Case for 8-Inch Water Line	750 LF	230.00	172,500.00
5	Bore & Case for 6-Inch Water Line	30 LF	180.00	5,400.00
6	Bore & Case for 4-Inch Water Line	100 LF	160.00	16,000.00
7	Driveway Bore & Case for 4-Inch Water Line	60 LF	100.00	6,000.00
8	Creek Crossing for 4-Inch Water Line	30 LF	150.00	4,500.00
9	8-Inch Gate Valve	5 EA	1,500.00	7,500.00
10	6-Inch Gate Valve	5 EA	1,000.00	5,000.00
11	4-Inch Gate Valve	6 EA	850.00	5,100.00
12	3-Inch Gate Valve	1 EA	800.00	800.00
13	2-Inch Gate Valve	2 EA	750.00	1,500.00
14	Connection	20 EA	4,000.00	80,000.00
15	Disconnection (Cut & Cap)	10 EA	2,100.00	21,000.00
16	Flush Hydrant Assembly	5 EA	3,500.00	17,500.00
17	Blowoff Assembly	3 EA	2,500.00	7,500.00
18	Meter Reconnection	20 EA	350.00	7,000.00
19	Meter Setting	10 EA	1,000.00	10,000.00
20	3/4-Inch P.E. Service Tubing	1,000 LF	10.00	10,000.00
21	Full Width Pavement Replacement	500 LF	50.00	25,000.00
22	Exploration	81 HR	200.00	16,200.00
Construction Total				\$730,000.00
Contingencies (10%)				73,000.00
<b>TOTAL CONSTRUCTION</b>				<b>\$803,000.00</b>

**CONTRACT NO. 2 - HOPEWELL WATER STORAGE TANK**

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	Erosion & Sedimentation Controls	1 LS	15,000.00	15,000.00
2	Site Preperation, Grading & Excavation	1 LS	10,000.00	10,000.00
3	500,000 Gallon Steel Multi-Column Elevated Tank			
3A	Foundation	1 LS	125,000.00	125,000.00
3B	Welded Steel Reservoir & Support Structure (80' Tall)	1 LS	700,000.00	700,000.00
3C	Appurtenances & Accessories	1 LS	20,000.00	20,000.00
3D	Coatings & Disinfection	1 LS	180,000.00	180,000.00
4	Yard Piping & Appurtenances	1 LS	20,000.00	20,000.00
5	Miscellaneous Site Improvements (Road, Parking, Ditches)	1 LS	20,000.00	20,000.00
6	Final Site Restoration & Cleanup	1 LS	10,000.00	10,000.00
Construction Total				\$1,100,000.00
Contingencies (10%)				110,000.00
<b>TOTAL CONSTRUCTION</b>				<b>\$1,210,000.00</b>

**PRELIMINARY COST ESTIMATE  
SOUTH LAUREL WATER SYSTEM IMPROVEMENTS  
LAUREL COUNTY WATER DISTRICT #2  
JANUARY 2017**

**SUMMARY NOTES**

**DEBT SERVICE CALCULATIONS:**

Debt Service based on interest rate of 2.50%, 40 year term.

Annual Debt Service based on a loan of \$1,645,000 = \$67,600

Annual Debt Reserve Allowance = ( $\$67,600 * 0.10$ ) = \$6,760

Total Annual Debt Payment = ( $\$67,600 + \$6,760$ ) = 74,360

Monthly Debt Payment = ( $\$74,360 / 12$ ) = \$6,196.67

**COST PER CUSTOMER CALCULATIONS:**

Monthly debt payment = \$6,196.67

Approximate Number of Customers = 5,900

Monthly Cost per Customer = ( $\$6,196.67 / 5,900$ ) = \$1.05