

Cost of Service Study
Prepared for
Berea Municipal
Utilities

Water Rates

August 2016



Executive Summary

Berea Municipal Utilities (“Berea”) engaged Norbourne Associates, LLC, to conduct an analysis of its water service rates. Norbourne Associates, LLC is a consulting company specializing in rate design, cost of service and economic analysis for electric, gas, steam, water and wastewater utilities.

Overview of the Rate Study Process

A comprehensive rate study typically utilizes three interrelated analyses to address the adequacy and equity of a utility’s rates. These three analyses are a revenue requirement analysis, a cost of service analysis, and a rate design analysis.

Revenue Requirement Analysis

Compares the sources of funds (revenues) to the expenses of the utility to determine the overall rate adjustment required

Cost of Service Analysis

Allocates the revenue requirements to the various customer classes of service in a “fair and equitable” manner

Rate Design Analysis

Considers both the level and structure of the rate design to collect the target

Norbourne Associates performed a revenue requirement analysis for the 12-month test period ended June 30, 2015 shown as Attachment 1.

After discussions with the management of Berea a 5% increase to water rates became the fair and equitable target for a change to rates.

Revenue requirement.

The first step in calculating the revenue requirement is to establish a time frame for the analysis. For this study, the time frame is the fiscal year ended June 30, 2015.

The second step in determining the revenue requirement is to decide on the basis of accumulating for costs. For Berea's revenue requirement, a cash needs approach was utilized. The cash needs approach is the most commonly used methodology for municipal utilities to set their revenue requirement. The actual revenue requirement developed for Berea was customized to follow its system of accounts. And certain pro-forma adjustments were made to normalize the analysis. Attachment 1 contains the derivation of the revenue requirements analysis.

Essentially, the cash needs approach states that the utilities revenue must be sufficient to cover all cash needs, this includes debt service. The following formula is useful in identifying the items generally included in a cash needs revenue requirements:

Cash needs = O&M + Debt Service + Projects – other Revenue

Where: *Cash needs* = Cash needs revenue requirements
O&M = Operation and maintenance expenses
Debt Service = Interest and Principal on all debt
Projects = Projects/improvements funded by rates
Other revenue = Other or miscellaneous revenue

Most municipal utilities use the cash need basis approach for establishing their revenue requirement and setting rates. This approach conforms to most municipal utility budgetary requirements and the calculation is easy to understand. The only deviation from this approach is the inclusion of depreciation expenses. This was included as a proxy for extensions and replacements.

The major components of this approach are as follow:

- Cash expenditures for a period of time to determine required revenues.
- Adds operation and maintenance (O&M) expenses to any applicable taxes or transfer payments to determine total operating expenses. Operation and maintenance expenses include the

- materials, electricity, labor, supplies, etc. needed to keep the utility functioning.
- Calculates capital costs by adding debt service payments (principal and interest) to capital improvements financed with rate revenues. In lieu of including capital improvements financed with rate revenues, a utility sometimes includes depreciation expense to stabilize annual revenue requirement.

Using the financial and operating results for the 12-month test period ended June 30, 2015, we made the following pro-forma adjustments:

Water:

- Increase in expenses: \$54,000
- Increase in depreciation: \$107,700 (extensions and replacements)
- Removal of Bond issue costs: \$32,900

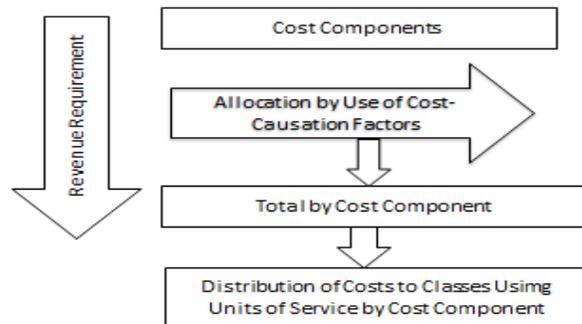
Our analysis indicates that Berea requires a base water rate increase of \$152,300. This represents about a 5% increase in total system operating revenues.

Cost of Service Study

A cost of service study was developed to provide guidance for allocating the revenue increase to the various customer classes and for developing rates that more accurately reflect the cost of providing service. Set forth in Attachment 2 is the functional assignment for Berea's water service. We used the functional cost allocation methodology to prepare the study.

The functional cost allocation methodology provides a cost-causation allocation approach. Under the functional cost method, operating expenses and capital costs are assigned to cost components using predominate operational, or service purposes, as cost-causation factors.

Below is a diagram that illustrates the basic allocation methodology.



Allocation of Wholesale costs

One of the major justifications for a comprehensive rate study is founded in economic theory. Economic theory suggests that the price of a commodity must roughly equal its cost if equity among customers is to be maintained.

This statement's implications on utility rate designs are significant. For example, a water utility usually incurs capacity-related costs in meeting its peak day requirements. It follows that the customers who cause maximum peak day demands should pay for those demand-related facilities in proportion to their contribution to maximum demands. Emphasis on seasonal and marginal cost-based utility rates embraces this economic concept. When costing and pricing techniques are refined, consumers have a more accurate picture of what the commodity costs to produce and deliver. This price-equals-cost concept provides the basis for our subsequent analysis.

Wholesale rates should be cost based. It has long been accepted that customers that receive benefits from the system should pay their share of transmission and distribution expenses used to maintain the system.

The formula used to develop the wholesale water rate is:

$$\frac{\text{Annual Cost of Water Service Caused by the Utility in Dollars}}{\text{Annual amount of Water Purchased by the Utility in 1,000 Gals.}}$$

This formula will allow Berea to recover all costs incurred for the part of the system that is jointly used. No subsidies should be caused by this rate.

Attachment 3 is the calculation of the wholesale rate in detail. The result is a rate of \$1.979, this is an increase of about 5.72%. This is slightly higher than the increase to the city of Berea.

However, a larger percentage of new expense is being incurred on behalf of wholesale customers. An example of this is the I-75, (Exit 76) waterline extension. It was in large part constructed for wholesale customers as was the lagoon project and mixing system upgrades at the West End tank. Furthermore, over the past five years wholesale water sales have increased by approximately 3.7%, in the same period Berea's retail sales have decreased by about 2.1%.

Berea serves two wholesale customers, they are:

- Garrard County
- Southern Madison

Using the Cost of Service Results to Design Rates

Once we have allocated costs to wholesale customers we can begin the development of retail rates. The remaining costs allocated to retail customers are calculated in Attachment 4.

As a practical matter, utilities should consider setting their rates around some generally accepted or global principles and guidelines. Utility rates should be:

- Cost-based, equitable, and set at a level that meets the utility's full revenue requirement
- Easy to understand and administer
- Designed to conform with generally accepted rate setting techniques

- Stable in their ability to provide adequate revenues for meeting the utility's financial, operating, and regulatory requirements
- Established at a level that is stable from year-to-year from a customer's perspective

Rates that meet the utility's objectives are designed based on both the revenue requirement and the cost of service analysis. This results in rates that are cost-based; however, rate design may also consider factors such as ability to pay, continuity of past rate philosophy, economic development, ease of administration, and customer understanding. We have kept these guidelines in mind in the design of Berea's retail rates.

In Berea's case, we are proposed not to change the customer charge. As such, the increase is only in the volumetric portion of the rate. The last rate study contained a change to the customer charge. Given the relatively low level of the increase we believe that no change to the customer charge was warranted. So, the overall rate structure was preserved.

Changes in rate structure can result in interclass revenue subsidies. In other words, some customers could see an above average increase and some a below average increase. This is due to each individual customer's consumption profile.

Impact of the Proposed Rate Increase

Based on the results of the cost of service study, we recommend increasing all rates to maintain the existing rate structure.

Attachment 5 illustrates the proposed allocation of the rate increase to the various classes of service and percentage increase for each rate class.

Berea Municipal Utilities
Revenue Requirement for
Water Service

Attachment 1

	WATER Cash Needs Approach	WATER Cash Needs Approach
1 Operation & Maintenance Expenses (No Depreciation)	\$ 1,145,752	\$ 1,145,752
2 Business Type Administrative and General Expenses	325,135	325,135
3 Interest Payment	229,769	229,769
4 Loan Administration Fees	10,342	10,342
5 Bond Issue Cost Amortization	32,892	-
6 Payment of Principal	755,087	755,087
7 Pro-forma increase in Expense	-	54,000
8 Pro-forma increase in Depreciation Exp. Water Plant	-	85,452
9 Pro-forma increase in Depreciation Exp. Admin	-	22,248
10 Interest and Principal on Source and Treatment Project	-	-
11 Depreciation Fund (Replacement Reserve)	658,166	658,166
12 Total	<u>\$ 3,157,143</u>	<u>\$ 3,285,952</u>
13 Other Revenue		
14 Other	\$ 86,694	\$ 86,694
15 Water Connection Fees	12,050	12,050
16 Customer Reimburse - Water	3,084	3,084
17 TOTAL Revenue Requirements from Rates	<u>\$ 3,055,315</u>	<u>\$ 3,184,124</u>
18 Current Revenue	\$ 3,031,807	\$ 3,031,807
19	-	-
20 Adjusted Test Year Revenue	<u>\$ 3,031,807</u>	<u>\$ 3,031,807</u>
21 Required Increase in Rate Revenue	\$ 23,508	\$ 152,316
22 Percentage	0.78%	5.02%

Berea Municipal Utilities

Attachment 2

Water Service
 Functional Assignment
 Year Ended June 30, 20015

EXPENSES		Transmission and Distribution				
		Commodity	Production	Distribution	Customer	
51001	Salaries: Full-time	250,448	112,702	57,603	80,144	
51002	Salaries: PT/Seasonal/Temp	-	-	-	-	
51003	Salaries: Overtime	23,230	10,454	5,343	7,434	
51004	Salaries: Holidays	4,356	1,960	1,002	1,394	
51102	Medial and Life Ins.	43,361	19,512	9,973	13,875	
51103	City Pension Contributions	30,291	13,631	6,967	9,693	
51104	City FICA Contributions	14,897	6,704	3,426	4,767	
51105	Medicare	3,484	1,568	801	1,115	
52000	Telephone	3,693			3,693	
52100	Electric - Buildings	258,737	258,737			
52300	Water Service	202			202	
52500	Waste Collection	865			865	
52700	Internet & Cable Service	1,199			1,199	
53000	General Office Supplies	109		109		
53001	Books/Manuals/Periodicals	-		-		
53010	General Operating Supplies	10,442		10,442		
53011	Operating Chemicals	119,900	119,900			
53030	Distribution System Supplies	-		-		
53033	Meter Supplies	-		-		
53200	Uniforms & Gear	4,647			4,647	
53300	Fuel	20,779	7,065	7,688	6,025.89	
53400	Small Tools & Equipment	7,512			7,512	
54000	Legal Services	-	-	-	-	
54011	Engineering Services	13,119	13,119			
54090	Other Professional Services	5,311	5,311			
54100	Advertising	195	66	72	56.55	
54200	Equipment Rent/Lease	-	-	-	-	
54500	Building & Grounds R&M	1,648	1,648			
54510	Equipment R&M	35,473	12,061	13,125	10,287.21	
54520	Vehicle R&M	3,340	1,503	768	1,069	
54530	Infrastructure R&M	73,369	33,016	16,875	23,478	
54610	Water Withdrawal Fees	164,430		115,101	49,329	
54630	Laboratory Analysis	16,351	16,351			
54650	KRA Withdrawal Fees	3,980		2,786	1,194	
54670	Land Farming	8,076	8,076			
54730	Postage & Shipping	-			-	
55020	Membership & Licenses	2,877	2,877			
55021	Education & Training	432	432			
55022	Conference/Meeting Expenses	1,428			1,428	
55023	Meals & Travel	1,063	638	425		
55030	Inventory Write-Off	268	94	147	27	
55031	Bad Debt Write Off	16,239	5,684	8,931	1,624	
55090	Contingency	-	-	-	-	
56900	Depreciation Expense	631,194	284,037	347,157	-	
57100	Interest Payment	229,769	103,396	126,373	-	
57200	Loan Administration Fees	10,342	4,654	5,688	-	
57300	Bond Issue Cost Amortization	-	-	-	-	
	Sub total	\$ 2,017,057	378,637	666,558	740,803	231,059
	Water Allocation @ 30% Adm Depr	26,972		12,138	14,835	-
	Business Type Administrative and General Exp	325,135		146,311	178,824	-
	Payment of Principal	755,087		339,789	415,298	-
		\$ 3,124,252	\$ 378,637	\$ 1,164,795	\$ 1,349,760	\$ 231,059
			12%	37%	43%	7%
	Pro-forma increase in Expense	54,000	6,544	20,132	23,329	3,994
	Pro-forma increase in Depreciation Exp. Water	85,452		38,453	46,999	
	Pro-forma increase in Depreciation Exp. Admin	22,248		22,248		
	Total Operating Expenses	\$ 3,285,952	\$ 385,182	\$ 1,245,629	\$ 1,420,088	\$ 235,052
	Less: Other Revenue	(101,828)				(101,828)
	Revenue Requirements from Rates	\$ 3,184,124	\$ 385,182	\$ 1,245,629	\$ 1,420,088	\$ 133,224

Berea Municipal Utilities

Attachment 3

Water Service

Development of Wholesale Rates (Water Districts)

Line Losses	0.2081			
	0.0000			
Sum	0.2081			
Production Mult		1.2628		
Inch Mile Ratio		0.0925		
Wholesale line loss		0.0192		
Join Plant use loss		0.0192		
Production Multiplier		1.0196		
Allocation of Production	49,349,076.0	1.2628		
	104,056,111.0	1.0196	0.5874	
Allocations of T & D	49,349,076.0			
	104,056,111.0	0.0925	0.0439	
Allocation of Commodity	49,349,076.0		0.4743	
	104,056,111.0			
Commodity	\$ 385,182	0.4743	\$ 182,674	
Production	\$ 1,245,629	0.5874	\$ 731,626	
T&D	\$ 1,420,088	0.0439	\$ 62,297	
Customer	\$ 235,052	0.0000	\$ -	
Total	\$ 3,285,952		\$ 976,597	
	Wholesale Sales		49,349,076.0	
	Proposed rate per formula		\$ 0.01979	
	Current Wholesale rate		0.018719	
	Difference		\$ 0.0011	
	Percentage Change		5.72%	

Berea Municipal Utilities

Attachment 4

Water Service

Remaining Costs to be allocated to Retail Customers

	<u>Total</u>	<u>Wholesale</u>	<u>Retail</u>
Commodity	\$ 385,182	\$ 182,674	\$ 202,507
Demand	\$ 2,665,718	\$ 793,923	\$ 1,871,795
Customer	<u>\$ 235,052</u>		<u>\$ 235,052</u>
Total	\$ 3,285,952	\$ 976,597	\$ 2,309,355
Other Operating			
Revenue	<u>\$ (101,828)</u>	<u>\$ -</u>	<u>\$ (101,828)</u>
Total	\$ 3,184,124	\$ 976,597	\$ 2,207,527

Bills Class 1 Residential		Cubic Feet	Rate	Test Year Revenue	Proposed Rate	Proposed Revenue	Dollar Increase	Percentage Increase
42,607	First 200 cubic feet	7,527,162	\$11.5000	\$ 489,981	\$ 11.50	\$ 489,981	0.00	0.00%
	Over 200 cubic feet	12,053,997	\$0.0436	525,554	\$ 0.048	\$ 573,770	0.00	9.17%
		19,581,159		\$ 1,015,535		\$ 1,063,751		4.75%
				\$ 978,151		\$ 1,024,592		

Bills Class 2 & 3 Comm/Indust		Cubic Feet	Rate	Test Year Revenue	Proposed Rate	Proposed Revenue	Dollar Increase	Percentage Increase
6,122	First 200 cubic feet	222,886	12.25	74,995	\$ 12.25	\$ 74,995	0.00	0.00%
	Next 1,800 cubic feet	4,035,248	0.0427	172,305	\$ 0.0437	176,340	0.00	2.34%
	Next 3,000 cubic feet	3,333,041	0.0392	130,655	\$ 0.0402	133,988	0.00	2.55%
	Next 5,000 cubic feet	3,350,034	0.0352	117,921	\$ 0.0362	121,271	0.00	2.84%
	Next 5,000 cubic feet	2,129,250	0.030	63,239	\$ 0.0307	65,368	0.00	3.37%
	Over 15,000 cubic feet	22,055,416	0.0267	588,880	\$ 0.0289	637,402	0.00	8.24%
		35,125,876		\$ 1,147,994		\$ 1,209,364		5.35%
				\$ 1,073,635		\$ 1,131,030		

Wholesale (Both Contracts)		Cubic Feet	Rate	Test Year Revenue	Proposed Rate	Proposed Revenue	Dollar Increase	Percentage Increase
		49,349,076	\$ 0.0187190	923,636.52	\$ 0.0197896	\$ 976,597	0.001071	5.72%
	Garrard County Contract	3,376,760	\$ 0.0187190	63,209.57	\$ 0.0197896	\$ 66,825	0.001071	5.72%
	Southern Madison County Contract	343,895,662	\$0.0025020	860,426.95	\$ 0.0026455	\$ 909,772	0.000143	5.73%
				923,636.52		\$ 976,597		

Hydrants	Customers	Rate	Test Year Revenue	Proposed Rate	Proposed Revenue	Dollar Increase	Percentage Increase
Hydrant	12	\$12.00	\$ 144	\$ 12.00	\$ 144	0.00	0.00%
Hydrant 3704	24	\$180.00	\$ 4,320	180.00	\$ 4,320	0.00	0.00%
			\$ 4,464		\$ 4,464		0.00%

Sprinkler	Customers	Rate	Test Year Revenue	Proposed Rate	Proposed Revenue	Dollar Increase	Percentage Increase
6 inch Sprinkler Line	711	\$47.25	\$ 33,595	\$ 47.25	\$ 33,595	0.00	0.00%
8 inch Sprinkler Line	204	\$65.75	\$ 13,413	65.75	\$ 13,413	0.00	0.00%
8 inch Sprinkler Line 3603	12	\$131.50	\$ 1,578	131.50	\$ 1,578	0.00	0.00%
10 inch Sprinkler Line	39	\$85.25	\$ 3,325	85.25	\$ 3,325	0.00	0.00%
			\$ 51,911		\$ 51,911		0.00%