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September 18, 2007

DYCENTED

Ms. Beth O'Donnell Executive Director Kentucky Public Service Commission 211 Sower Blvd. P. O. Box 615 Frankfort, KY 40601

SEP 18 2007

PUBLIC LATINGE COMMISSION

#### Re: Open Records Request Received July 18, 2007

Dear Ms. O'Donnell:

In my Open Records Response dated July 30, 2007, I advised you I would supplement my response should there be any other documents responsive to the Public Service Commission's Open Records Request. Louisville Water Company submits the following supplemental response:

2. All documents (including studies, analyses, and reports) that have been prepared or commissioned since January 1, 1994 and that address the cost, whether known or estimated, to LWC of providing water or water-related services to KAWC.

Response: In addition to the documents produced in LWC's July 30, 2007 response, please find the following document:

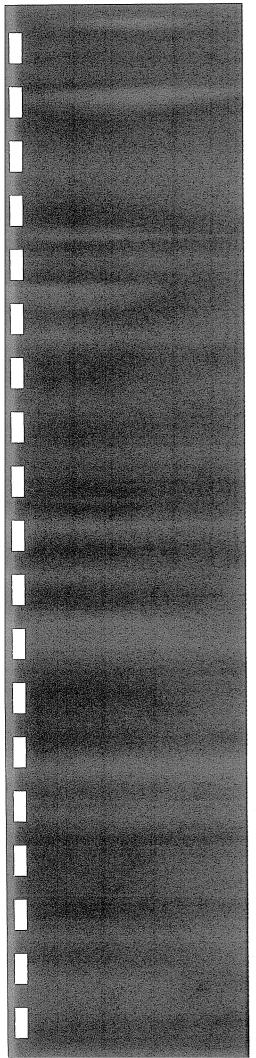
• Comparison of the Louisville Pipeline and Pool 3 Options to Serve Central Kentucky Water Customers, Final Report, September 2007

LWC agrees to further supplement this response should other responsive documents come to our attention. Please contact me at 502/569-0808 if you have questions regarding our response.

Sincerely,

Villen

Barbara K. Dickens Vice President, General Counsel and Official Custodian of the Records



**Final Report** 

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SEP 18 2007 PUBLIC SERVICE COMMISSION

## Comparison of the Louisville Pipeline and Pool 3 Options to Serve Central Kentucky Water Customers

Louisville Water Company

September 2007



**Final Report** 

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SEP 1 8 2007 PUBLIC SERVICE COMMISSION

Comparison of the Louisville Pipeline and Pool 3 Options to Serve Central Kentucky Water Customers

Louisville Water Company

September 2007



## Comparison of the Louisville Pipeline and Pool 3 Options to Serve Central Kentucky Water Customers

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#### Louisville Water Company

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# Section 1 PROJECT INTRODUCTION



# Section 1 PROJECT INTRODUCTION

#### 1.1 Background

A number of communities in the Lexington area are facing a long-term water supply shortage resulting from safe yield limitations of the Kentucky River. The major water purveyor in the area, Kentucky American Water Company (KAW), currently receives all of its' raw water from Pool 9 of the Kentucky River. Beginning in the early 1990's, KAW began looking for alternative supplies for future system growth. After evaluation of 50 alternatives, KAW selected an alternative that involved the purchase of treated water from the Louisville Water Company (LWC) and transmission of the water some 75 miles across central Kentucky to Lexington. A purchase and sale agreement was executed between KAW and LWC, but in response to opposition by certain potentially affected stakeholders, KAW determined not to pursue the pipeline project.

A number of the communities surrounding Lexington formed the Bluegrass Water Supply Commission (BWSC) in 2004 with a mission to develop a solution to the longterm water supply problem. Both KAW and the BWSC have analyzed their water supply alternatives over the past few years, and have each decided to pursue Pool 3 of the Kentucky River as the preferred water supply source for the foreseeable future. KAW has recently completed the engineering design and permitting processes for the implementation of a 20 MGD Pool 3 project, and have invited the BWSC to piggyback their project for an additional 5 MGD to serve the needs of their member communities.

Since 2003, the LWC has made four distinct proposals to the BWSC and its' member governments at their request. All proposals established a point of delivery at the intersection of Interstate 64 and KY-53 in Shelby County. These proposals are summarized below:

- August 8, 2003 (amended proposal from July 9)- presented two scenarios, one a 5 MGD base flow and 10 MGD reserve capacity (25 MGD design capacity) and the other a 9 MGD base flow with an 18 MGD reserve capacity (45 MGD design capacity). Fixed costs were assigned for the base flow amount, a separate rate charged up to the reserve capacity, and the wholesale rate charged for usage above the reserve capacity up to the design capacity of the pipeline.
- December 15, 2005- five alternatives were presented, with minimum purchase amounts ranging from 2 MGD to 6.2 MGD, and design capacities ranging from 10 MGD up to 31 MGD. Most alternatives suggested a three-tiered rate structure, with one option involving reserve capacity quantity that varied from the design capacity of the pipeline.



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### Section 2 FINANCIAL MODEL AND ASSUMPTIONS



The modeling objective is to determine the life-cycle cost impact of the two alternatives on the customers within Central Kentucky. These customers are currently served by both KAW and BWSC member governments. The goal is to analyze the alternatives from both a present-worth cost basis and an annualized cost per 1,000 gallons basis.

There are two major components to any life-cycle cost comparison—capital costs and operating expenses. R.W. Beck did not develop any independent cost estimates for either the capital or operating components of the projects. Much of the cost information was derived from two previously prepared engineering reports:

- 2. Final Report for the Water System Regionalization Feasibility Study, prepared for the Bluegrass Area Development District by O'Brien & Gere Engineers, Inc., February, 2004
- 3. *Water Supply Study*, prepared for Kentucky American Water Company by Gannett Fleming, Inc., March, 2007

R. W. Beck also reviewed numerous documents provided by LWC, containing Kentucky Public Service Commission testimony and previous presentations by KAW, LWC and O'Brien & Gere on behalf of the BWSC, incorporating the data into the models as appropriate.

### 2.1 Capital Costs

Capital cost information was obtained from various sources and adjusted to 2007 dollars by the Engineering News Record (ENR) Construction Cost Index. Estimated construction costs were inflated for contingency, and soft costs added for engineering, legal, administrative expenses, permitting, easements and land purchases. The add-on percentages were held consistent with those used by both O'Brien & Gere and Gannett Fleming in their studies. Capitalized interest was charged during an assumed two-year construction period for Phase 1, and issuance costs were assumed for debt financing. Future capital expenditures were inflated by the Handy Whitman index for both pipeline and treatment plant cost elements.

The model translates the capital expenditures into an annual cost allocation by determining the principal and interest on a municipal bond issue for the publicly-financed portions of the project, or applying KAW's after-tax allowable rate of return on their rate base (7.75%).

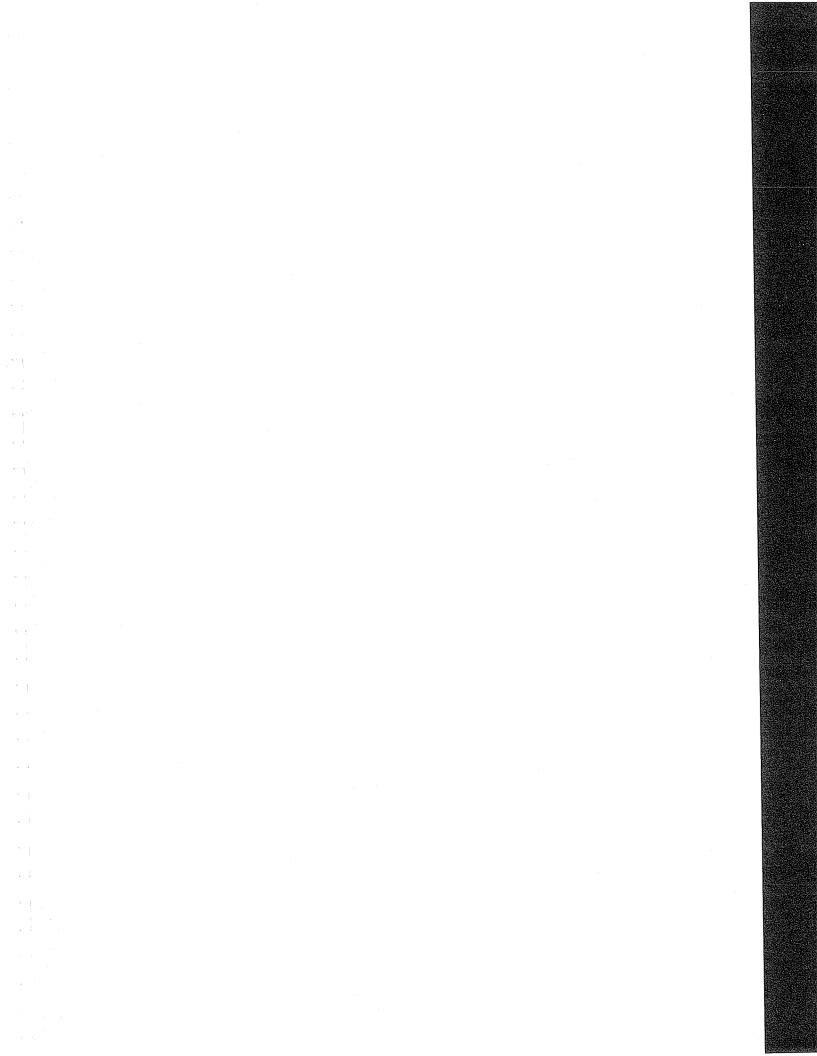
The following table outlines the capital cost assumptions used as part of the baseline case in the financial model.



### 2.4 Model Output

The financial model generates results in two basic ways. First, a present worth cost is determined by taking the annual cost for each year over the timeframe modeled, and discounting back to 2007 using an assumed discount rate of 4.7% based on the opportunity cost of capital to the impacted customers. The difference in the present worth cost represents the difference paid by the end users for the two alternatives over the 20 or 40-years of operation in today's dollars.

The second output from the model is a plot of the cost per 1,000 gallons over the timeframe analyzed. This approach provides a more graphical representation of the financial impacts to customers over time for the two alternatives.



## Section 3 PHASE 1 (2030) ANALYSIS

R'W'BECK

The first phase of the investigation was to perform a financial analysis of two alternatives:

- 1. Kentucky River Pool 3 option, involving a 25 MGD intake, water treatment plant and high-service pump station at Pool 3, and a 30 mile, 42-inch transmission main from the treatment plant to the connection to the KAW system at Iron Works Road (KY 1973) and Newtown Pike (KY 922) in Fayette County.
- 2. A 42 mile, 42-inch finished water transmission main from KY 53 in Shelby County, along the I-64 corridor to approximately the same point of connection with the KAW system in Fayette County.

Both of the above alternatives include a booster pump station and a 3 million gallon storage tank along the transmission pipeline route, including the land acquisition costs.

The analysis for each alternative includes the capital construction cost in 2007 dollars, plus the operating and maintenance (O&M) expenses over 20 years starting in 2010. This initial investigation (Phase 1) is expected to provide a 20-year solution, assuming that Pool 3 can sustain a 30 MGD withdrawal under peak day flow conditions, and that customer growth will result in approximately 0.5 MGD of additional flow each year from an initial value of 6 MGD.

The wholesale rate from LWC is initially \$1.71/1,000 gallons, and inflates at 3% per year through 2030. Both the Pool 3 and LWC pipeline options include the Kentucky River Authority withdrawal permit fee of \$0.05/1,000 gallons. The Pool 3 alternative also includes a capital project to address the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), published by the U.S. EPA in the Federal Register on January 6, 2006 with a 2012 compliance deadline. For the purpose of this investigation, we have assumed that the Pool 3 treatment plant will require an additional 1-log inactivation of Cryptosporidium, and that the likely technology to achieve the additional treatment credit will be with ultraviolet light (UV). The costs for UV disinfection were estimated in the March 2007 Gannett Fleming report and are included in the Pool 3 model assuming an installation date of 2011. Investments in the LWC system to comply with future drinking water regulations are included in the future increases in their wholesale rate.



Capital Costs - Pool Three Option (2007 \$1,	
Intake, Pump Station and Treatment Plant	\$ 54,867
Raw Water Main	402
42" Transmission Pipeline	48,300
Booster Pump Station/Storage tank	<u>4,743</u>
Construction Cost Estimate	\$108,312
Contingency @ 20%	<u>21,662</u>
Probable Construction Cost	\$129,974
Permitting/Easements @ 5%	6,499
Engineering, Legal, and Administrative @ 20%	25,995
Land	<u>788</u>
Subtotal- Capital Cost	\$163,256
Capitalized Interest @ 6.5% for two years	3,183
Issuance Costs @ 1% of long-term debt	<u>980</u>
Issuance Costs @ 178 Or long-term debt	<u> 500</u>
Total Pool 3 Phase 1 Project Cost	<u>500</u> \$167,419
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option	
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option UV Capital Expenditure (2011 \$1,000)	\$167,419
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option UV Capital Expenditure (2011 \$1,000) UV Disinfection Costs	<b>\$167,419</b> \$ 5,355
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option UV Capital Expenditure (2011 \$1,000) UV Disinfection Costs Contingency @ 20%	\$167,419 \$ 5,355 <u>1,070</u>
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option UV Capital Expenditure (2011 \$1,000) UV Disinfection Costs Contingency @ 20% Probable Construction Cost	<b>\$167,419</b> \$ 5,355 <u>1,070</u> \$ 6,425
Total Pool 3 Phase 1 Project Cost Table 3-3 Capital Costs - Pool Three Option UV Capital Expenditure (2011 \$1,000) UV Disinfection Costs Contingency @ 20% Probable Construction Cost Permitting @ 5%	\$167,419 \$5,355 <u>1,070</u> \$6,425 321
Total Pool 3 Phase 1 Project Cost         Table 3-3         Capital Costs - Pool Three Option         UV Capital Expenditure (2011 \$1,000)         UV Disinfection Costs         Contingency @ 20%         Probable Construction Cost         Permitting @ 5%         Engineering, Legal, and Administrative @ 20%	\$167,419 \$5,355 <u>1,070</u> \$6,425 321 <u>1,285</u>
Total Pool 3 Phase 1 Project Cost         Table 3-3         Capital Costs - Pool Three Option         UV Capital Expenditure (2011 \$1,000)         UV Disinfection Costs         Contingency @ 20%         Probable Construction Cost         Permitting @ 5%         Engineering, Legal, and Administrative @ 20%         Subtotal- Capital Cost	\$167,419 \$5,355 <u>1,070</u> \$6,425 321 <u>1,285</u> \$8,031

## Table 3-2Capital Costs - Pool Three Option (2007 \$1,000)

LWC report final\_091707 9/17/07

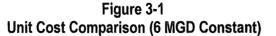
**Total UV Project Cost** 

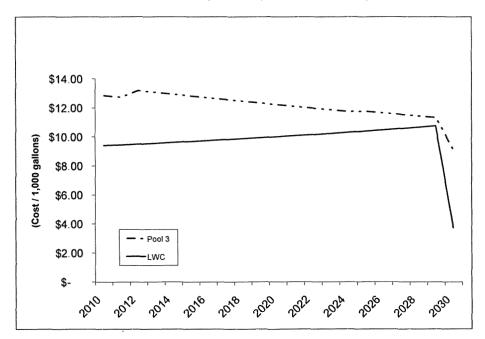
\$ 8,372

	Constant Flow 6 MGD	Increasing Flow 0.5 MGD/yr
Pool 3 Option	\$ 316,518	\$ 326,431
LWC Option	<u>\$ 250,258</u>	<u>\$ 297,688</u>
Difference	\$ 66,260	\$ 28743
%	21%	9%

Table 3-4
<b>Comparison of Present Worth Costs</b>
2010-2030 Analysis (\$1,000)

The model also compares the two options on a cost per 1,000 gallons basis. Figure 3-1 and 3-2 plot the cost of each option over the 20-year analysis period for the two baseline cases. When the flow rates remain constant, the Louisville pipeline option is always less expensive on a unit cost basis as shown in Figure 3-1. The LWC option curve goes up because both the operating expenses and the wholesale rate are increasing. The Pool 3 option curve goes down because asset depreciation is reducing the return to KAW on their portion of the project, and that reduction is greater than the increases in operating expenses. After 20 years, the municipal revenue bonds used to fund the LWC pipeline and 20% of the Pool 3 option are retired, which will reduce the unit costs in 2030 to below \$4/1,000 gallons for LWC and below \$10/1,000 gallons for Pool 3.





#### 3.4 Sensitivity to LWC Wholesale Rate

The most significant variable in the analysis is the assumed increase in the rate charged by Louisville Water Company to its' wholesale customers. Over the past 15 years, the LWC wholesale rate has increased by an average of 2%. The baseline case presented above assumed an annual increase of the wholesale rate of 3% from the current rate of \$1.71/1,000 gallons purchased. The model was used to analyze the effect of varying the future rate increases from 1% to 5% per year over 20 years.

The lower increase of 1% was chosen to reflect the potential that selling wholesale water to Central Kentucky customers spreads the fixed cost of operation across a larger volume of water distributed, and could result in rate increases below the 2% per year average over the past 15 years. The upper limit of 5% recognizes the potential that addition of enhanced treatment at both the Crescent Hill and B.E. Payne treatment plants to meet the 2012 regulations could cause a short-term wholesale rate increase above the rate of inflation.

Figure 3-3 presents the present worth cost of each alternative through the year 2030. The results indicate that at a 6 MGD constant flow rate, the difference between the Pool 3 option and the LWC option ranges from \$76 million at 1% annual increase to \$54 million at a 5% annual increase. The second set of plots show the same comparison for the 0.5 MGD per year flow increase. In this case, the LWC option is lower on a present worth basis by \$48 million at 1% annual increase in the wholesale rate, down to a \$3.5 million advantage at a 5% increase.

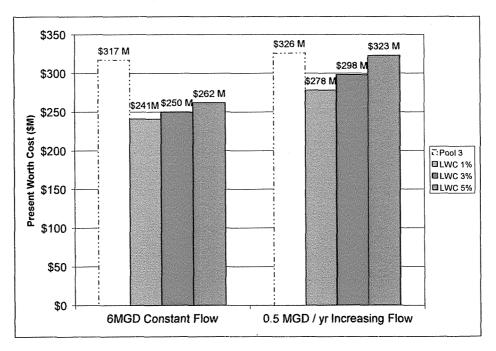


Figure 3-3 Phase 1 (2030) Present Worth Cost Comparison

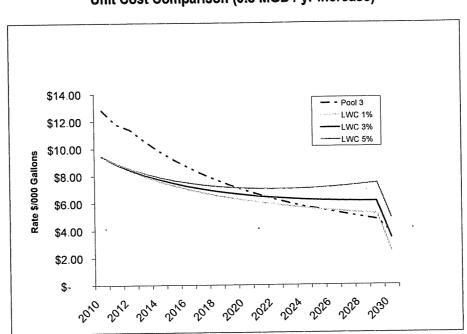
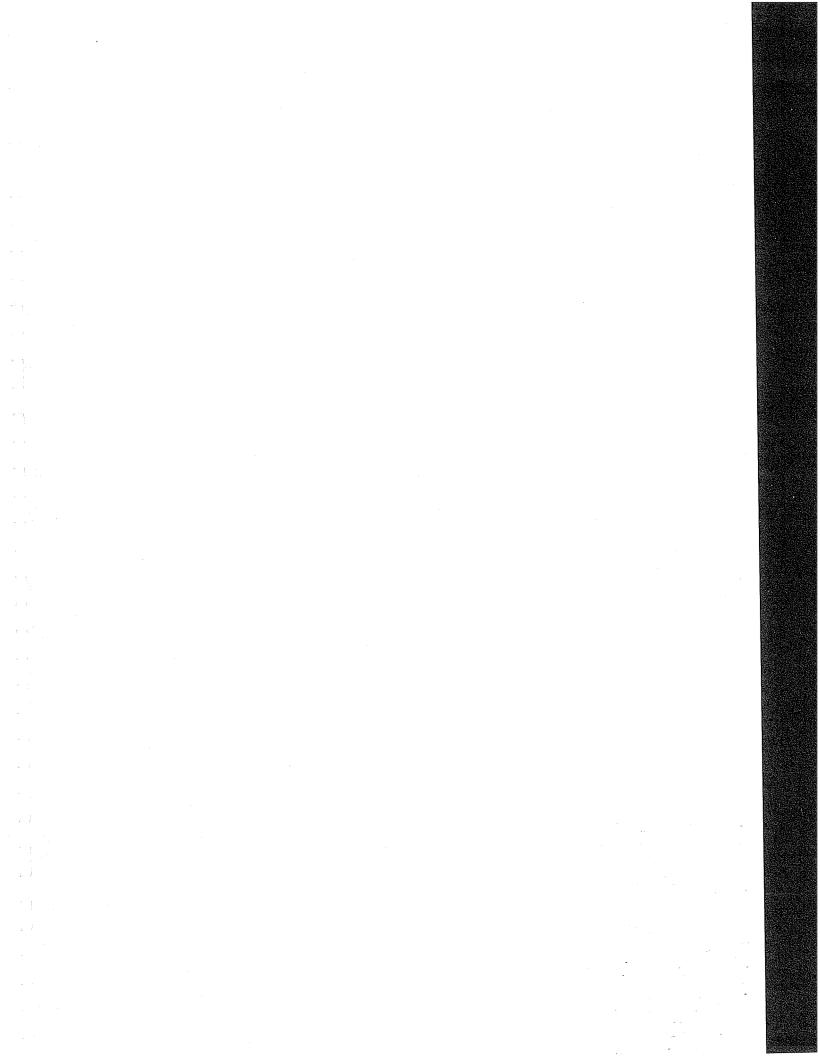


Figure 3-5 Unit Cost Comparison (0.5 MGD / yr Increase)



## Section 4 PHASE 2 (2050) ANALYSIS



## Section 4 PHASE 2 (2050) ANALYSIS

Previous studies acknowledge that a Pool 3 solution on the Kentucky River is likely a 20 to 25-year solution based on projected regional growth and an assumed 30 MGD of available capacity. The recommended Kentucky River solution outlined in the O'Brien & Gere study contemplated a second phase raw water pipeline to the Ohio River from Pool 3 at some point in the future.

Given the need for source water from the Ohio River, our Phase 2 investigation analyzes options to expand on the initial 25 MGD plan. If we assume that demand continues to increase by 0.5 MGD each year, phase 2 options will need to provide an additional 10 MGD average flow over that timeframe, for a total peak capacity of 45 MGD. Since the previously constructed 42-inch transmission mains can carry up to 31 MGD, the additional 14 MGD can be accommodated with a 30-inch diameter line for both the new raw water main and the parallel treated water transmission lines in both alternatives.

Phase 2 of the Pool 3 option will therefore include the following capital components:

- Construction of a new 15 MGD river intake and raw water pump station in the Ohio River
- Construction of a new 30 mile, 30-inch raw water main from the Ohio River to the Pool 3 WTP
- Expansion of the treatment plant and associated facilities to 45 mgd
- Construction of a parallel 30-inch transmission main from Pool 3 to Lexington
- Addition of a new booster pump station for the 30-inch treated water main
- Addition of a new 2 million gallon storage tank along the 30-inch pipeline route

Phase 2 of the LWC pipeline option will include:

- Construction of a parallel 30-inch transmission main from Shelbyville to Lexington
- Addition of a new booster pump station for the 30-inch main
- Addition of a new 2 million gallon storage tank along the 30-inch pipeline route

Since the current peak day capacity of the LWC treatment plants is 240 MGD, one or both of their plants will need to be expanded by at least 10 MGD by 2030 to accommodate the 45 MGD peak day flow for Central Kentucky. LWC has indicated they will increase the capacity of the B.E. Payne plant by 15 to 30 MGD before 2030, and those costs will be reflected in the wholesale rate.



Ohio River Intake and pump station	\$ 3,774
Raw Water Main	34,060
Treatment plant expansion	35,765
Transmission Pipeline	34,060
Booster Pump Station/Storage tank	3,165
Land	<u>200</u>
Construction Cost Estimate	\$111,024
Contingency @ 20%	22,165
Probable Construction Cost	\$133,189
Permitting/Easements @ 5%	6,659
Engineering, Legal, and Administrative @ 20%	<u>26,638</u>
Subtotal- Capital Cost	\$166,486
Capitalized Interest @ 6.5% for two years	3,871
Issuance Costs @ 1% of long-term debt	<u>998</u>
Total Pool 3 Phase 2 Project Cost	\$171,355

Table 4-2Phase 2 Capital Costs - Pool Three Option (2007 \$1,000)

### 4.2 Operation and Maintenance Expenses

O&M expenses in phase 2 were computed in similar fashion as was done for Phase 1. Two additional staff are assumed for the new Ohio River intake and raw water pump station facilities. Other fixed treatment plant costs were increased by the rate of inflation, while variable costs increased by both the rate of inflation and flow rate. Wholesale rate increases were once again assumed at 3% per year to be consistent with the assumed rate of inflation and construction cost increases.

### **4.3 Modeling Results**

The model was run through the year 2050 under two distinct scenarios.

1. Both the Pool 3 and LWC option continue to provide 6 MGD on an average day basis throughout the analysis period. Under this scenario, the second phase of capacity expansion is not constructed.

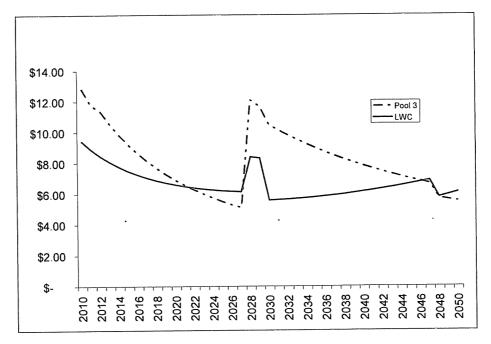
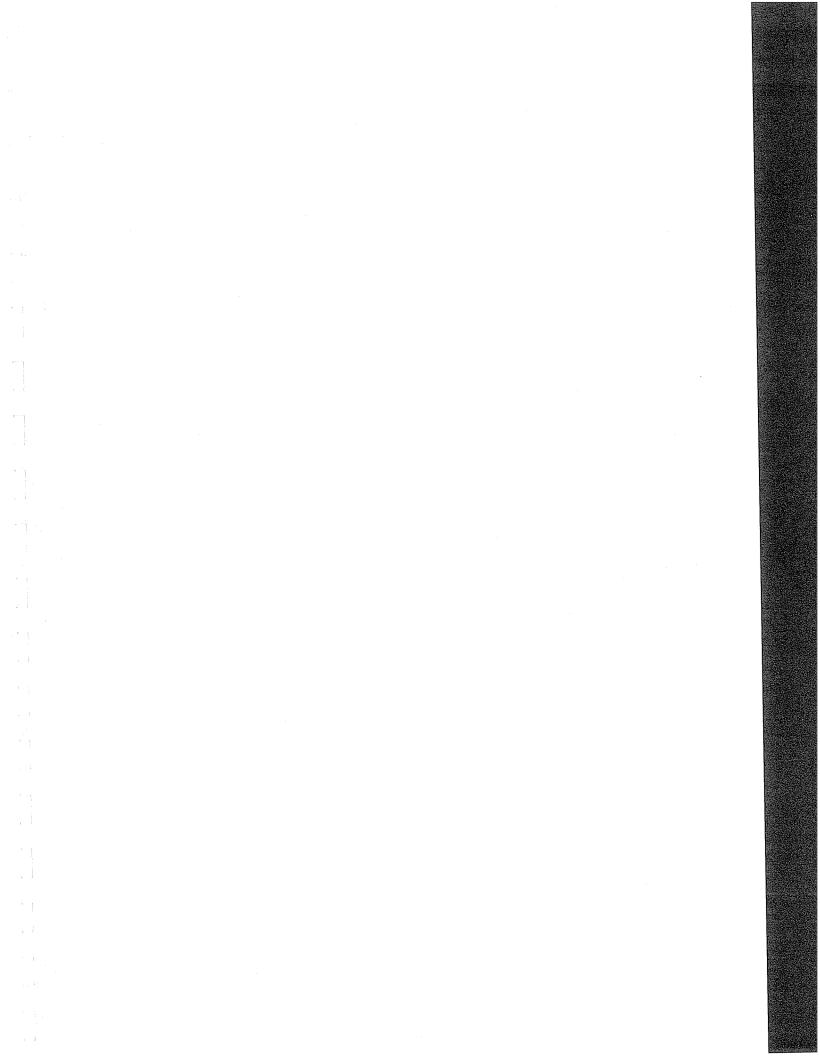


Figure 4-2 Unit Cost Comparison (0.5 MGD Increase)



# Section 5 ALTERNATIVE LWC PIPELINE PROPOSAL

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# Section 5 ALTERNATIVE LWC PIPELINE PROPOSAL

Louisville Water Company believes that delivering up to 25 MGD from Louisville can be accomplished with a 36-inch pipeline rather than the 42-inch pipe utilized in the modeling effort. The reason for using a 42-inch pipeline, our model from Shelby County was to have an "apples-to-apples comparison" between the Pool 3 project and the LWC option. The 42-inch pipeline was chosen to transport the water from the Pool 3 facility to Fayette County in order to maintain water velocity below a nominal 5 feet per second (fps) at up to a 30 MGD flow rate. The larger diameter pipe also dissipates less energy (head loss) over the length of pipeline to be constructed, thereby reducing the need for additional booster pumping and lowering power costs to transport the water.

R.W. Beck was asked to consider the viability of a 36-inch pipeline for this project. While a detailed engineering study of the pipeline plan and profile would be required to fully understand the issues surrounding the use of a smaller pipeline, it appears the 36-inch alternative has merit in this application for the following reasons:

- 1. Given the lower cost of a 36-inch pipe, the total project cost could be as much as 20% less than the 42-inch option modeled based on lower construction costs and if lower contingencies and engineering cost assumptions are used;
- 2. The 5 fps velocity criterion is violated when flows exceed 23 MGD, which would occur only under the most severe peak flow conditions anticipated (at 25 MGD the velocity is 5.5 fps); and
- 3. Energy loss across the pipeline is about twice as large for the 36-inch versus the 42-inch pipeline, which will likely require an additional booster pumping station and higher electrical costs to operate.

#### **5.1 Capital Costs**

The following capital costs were used as input to the financial model for an assumed 36-inch pipeline alternative from Shelby County to Fayette County. This alternative includes an additional booster pump station along the pipeline alignment, but also includes lower contingency and engineering costs typically associated with pipeline projects. The total project cost for the 36-inch alternative is \$25 million (22%) less than the cost for the 42-inch pipeline.

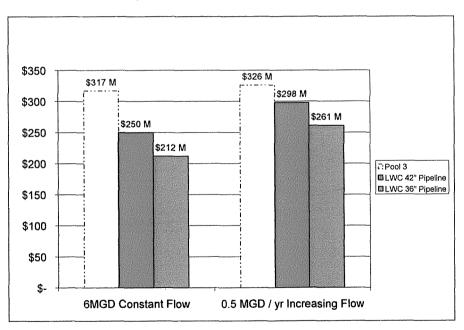


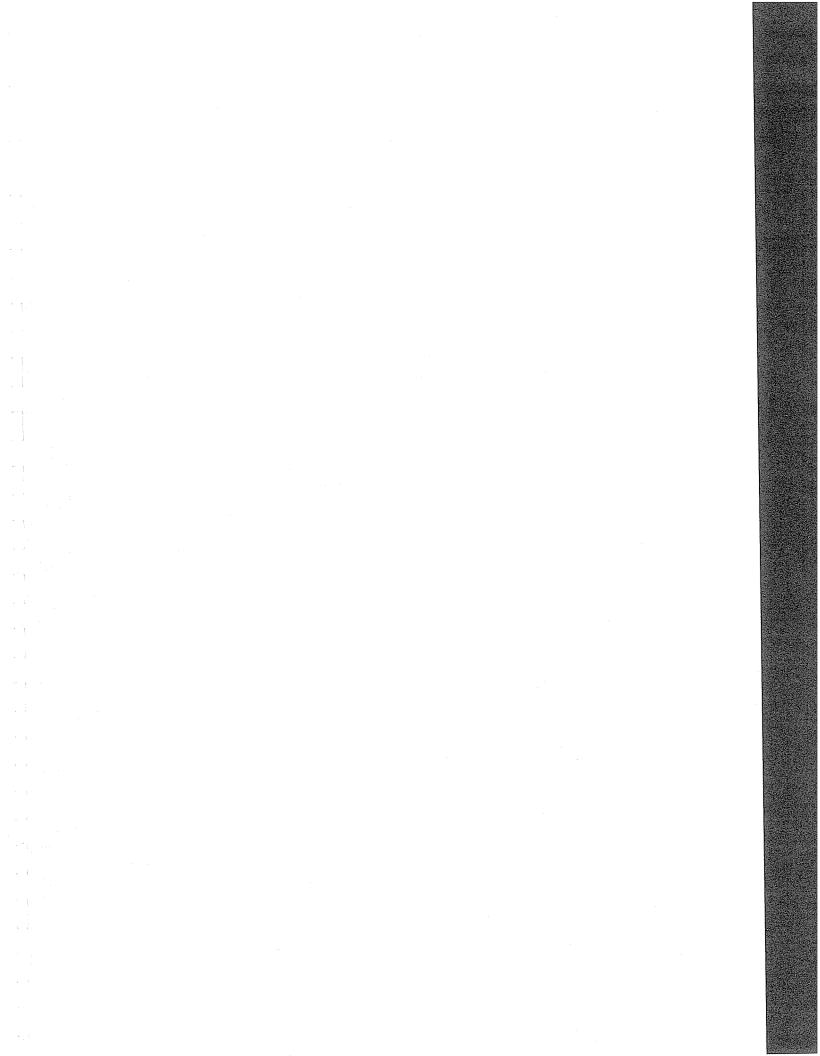
2010-2030 Analysis (\$1,000)		
	Constant Flow 6 MGD	Increasing Flow 0.5 MGD/yr
Pool 3 Option	\$ 316,518	\$ 326,431
36-inch LWC Option	<u>\$_211,614</u>	<u>\$ 261,078</u>
Difference	\$ 104,904	\$ 65,353
%	33%	20%

Table 5-2
Comparison of Present Worth Costs
2010-2030 Analysis (\$1,000)

Figure 5-1 presents the present worth costs for the Pool 3 option and both LWC options under both scenarios. A comparison was also made between the unit costs of the three options for both scenarios as shown on Figures 5-2 and 5-3. These results clearly demonstrate the benefits of using the smaller diameter pipeline to deliver water from Louisville to Central Kentucky, and the enhanced benefit of that alternative over the Pool 3 option.

Figure 5-1 Phase 1 (2030) Present Worth Cost Comparison





# Section 6 SUMMARY AND CONCLUSIONS

R'W'BECK

#### 6.1 Capital Costs

The capital costs for the Pool 3 and LWC pipeline options were compared. R.W. Beck performed no independent cost estimates, but rather extracted the estimated capital costs from previous engineering studies. Our investigation also included a 36-inch pipeline alternative from Louisville, as well as a Phase 2 project to expand both options in the case of increasing flows and capacity needs beyond the year 2030. Table 6-1 presents a summary of the capital cost comparison.

Table 6-1

	Pool 3	LWC-42"	LWC-36"
Phase 1 (2007-2030)			
Construction Estimate	\$ 108.3	\$ 73.0	\$ 64.5
Contingency	<u>21.6</u>	<u>14.6</u>	<u>6.4</u>
Probable Construction Cost	\$ 129.9	\$ 87.6	\$ 70.9
Engineering/permitting/admin	33.3	22.0	14.3
Interest/financing	<u>4.2</u>	<u>3.7</u>	<u>2.9</u>
Total Phase 1 Project Cost	\$ 167.4 <sup>1</sup>	\$ 113.3	\$ 88.1
% difference		32%	<b>47</b> %
Phase 2 (2030-2050)			
Construction Estimate	\$ 111.0	\$ 54.1	
Contingency	<u>22.2</u>	<u>10.8</u>	
Probable Construction Cost	\$ 133.2	\$ 64.9	
Engineering/permitting/admin	33.3	16.2	
Interest/financing	<u>4.8</u>	<u>2.4</u>	
Total Phase 2 Project Cost	\$ 171.3	\$ 83.5	
% difference		51%	

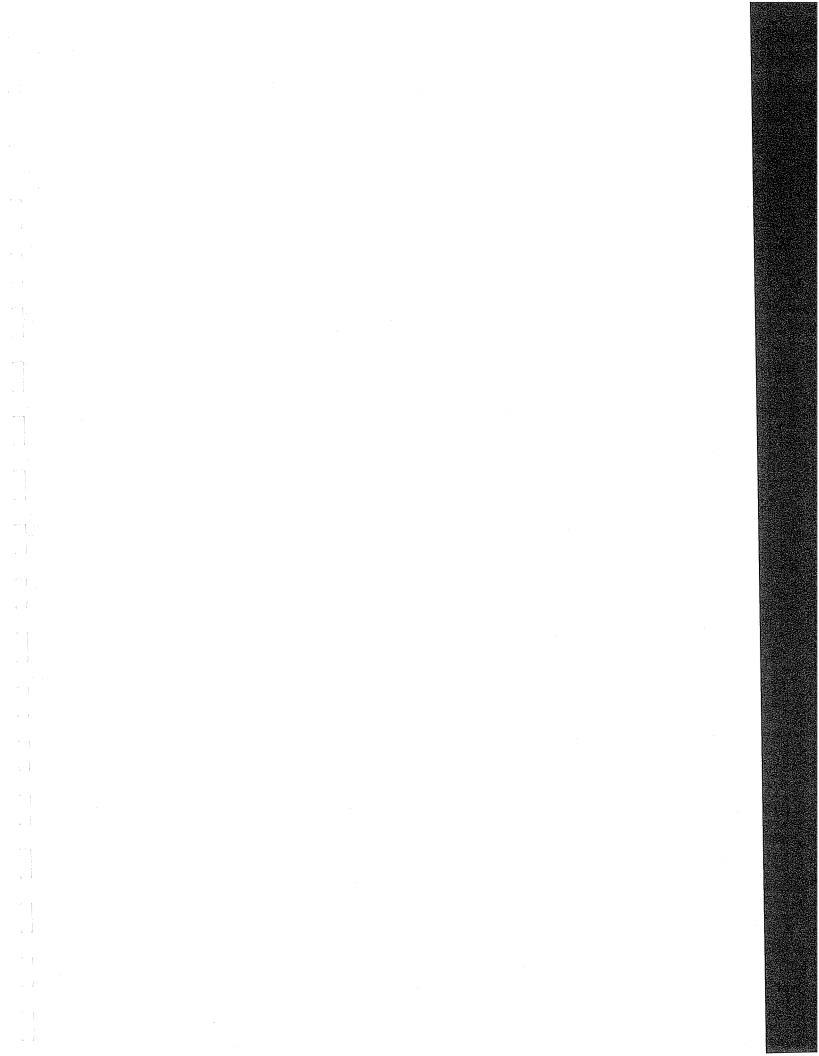
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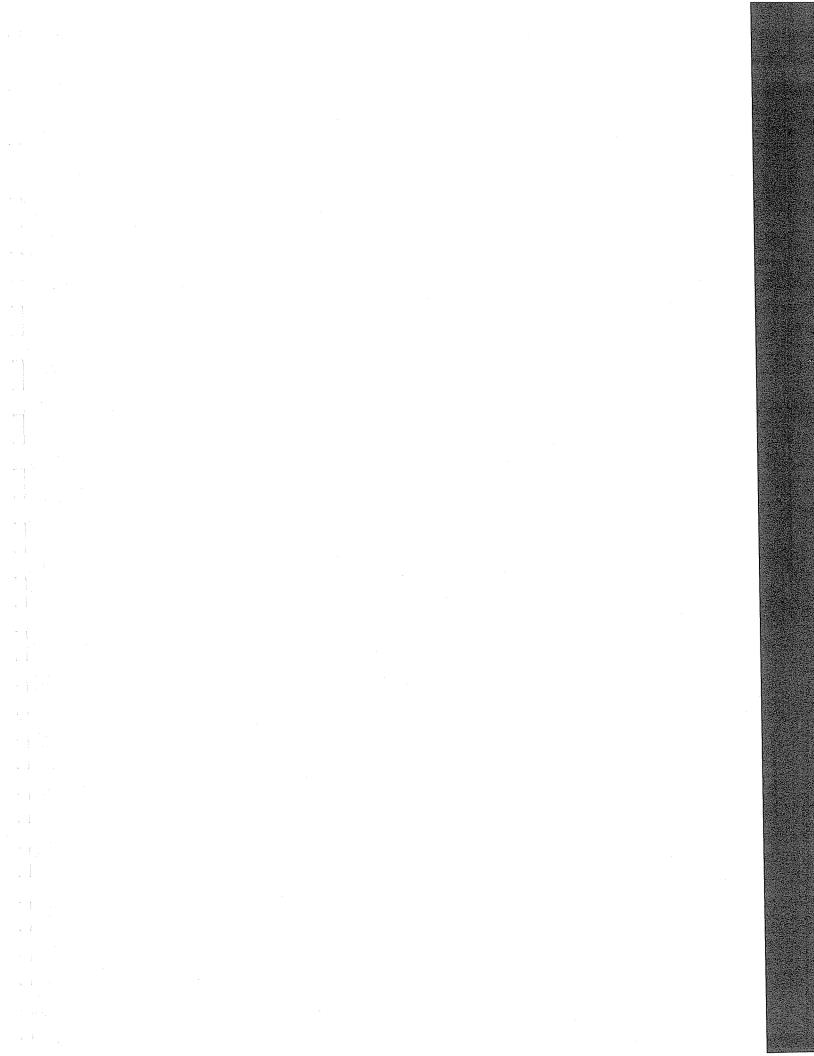
The only scenario that produced similar present worth costs between the LWC and Pool 3 options was the case where the LWC wholesale rate increased by 5% each year as opposed to the 3% per year assumption used in the baseline models. In discussing this with LWC, we believe it is possible that rate increases of that magnitude are possible in the short term, but unlikely over a sustained 20 or 40-year period. The economic conditions assumed in the model include a 2.4% inflation rate and an annual capital construction cost increase of 3%. Given these metrics and the fact that the LWC wholesale rate has increased by an average of 2% over the past 15 years, R.W. Beck is comfortable with the 3% per year wholesale rate increase assumption.

#### 6.3 Conclusions

Delivering water from the Louisville Water Company to Central Kentucky customers through a publicly-owned pipeline from Shelby County is a more cost-effective alternative than constructing the proposed new intake and treatment plant on Pool 3 of the Kentucky River. Although the Pool 3 option becomes more cost-effective with increasing flows and better utilization of the assets, the LWC wholesale rate must increase by 5% per year for more than 20 years in order for the LWC pipeline option to approach the Pool 3 present worth cost.

Increasing flows will eventually deplete the capacity of Pool 3 and require an Ohio River supply. The capital cost to provide an Ohio River expansion of the Pool 3 option is twice the cost of a parallel pipeline to Louisville, and translates into significantly higher present worth costs for the Pool 3 option beyond 2030.





### Appendix A INCREASING FLOW SCENARIO SAMPLE MODEL OUTPUT



## Appendix A-1 POOL 3 OPTION



Wate: Louisville Water Company Pool Thron Option

	89315 5 2007	2008 <u>2009</u> 2010	2011	2012 20	5	2014 20	2015	2016	2017
Capital Exponditures									
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ast af 25 MGD aunst - GF Report Pa Gannett Fiertung Report Page 28

### Water weeks of a Analysis Louisville Water Company Poul Three Option

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#### Appendix A-2 LWC OPTION



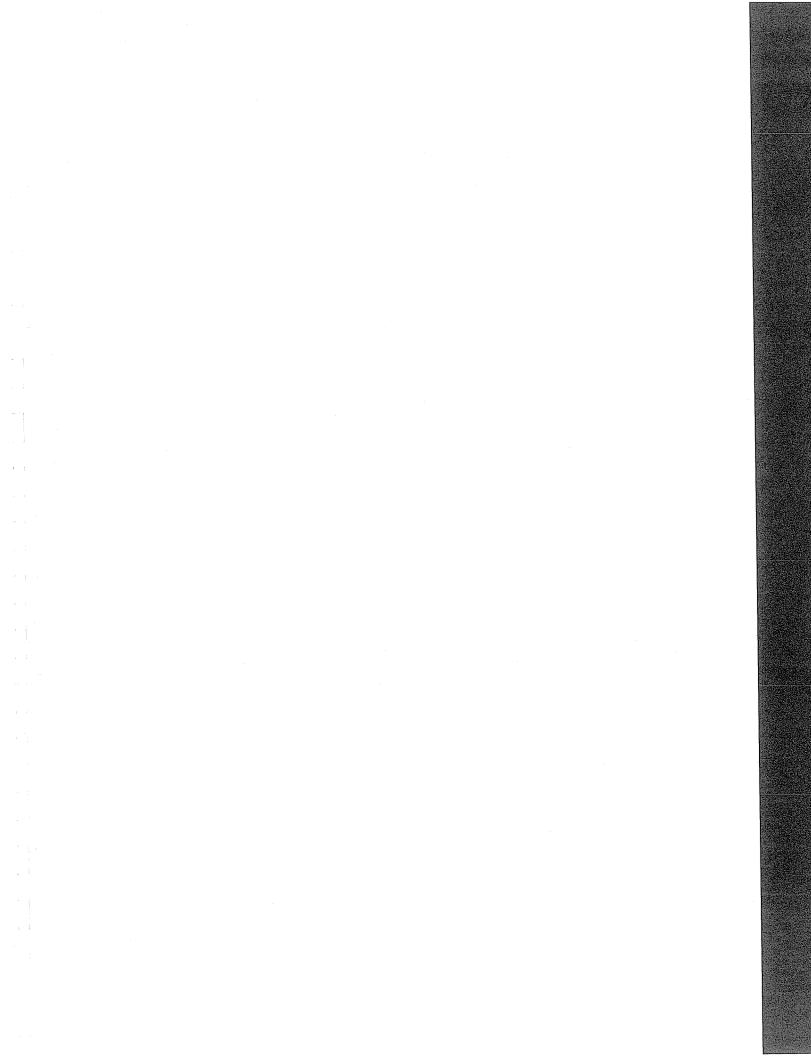
## Water Supply Option Analysis Louisville Water Company Louisville Water Company Option

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Rum and Replacement Fund (Transmission)         13%	Debt Service - Phace Two <sub>tra</sub> KRA Withdrawd Fe on Total Other Dooration Exponses								10		1	10		146.00	ŝ	5	164,250
Rowal and Represent Fund (Fraction Flow)       235         Total Annual Express (3) $697,00$	Renewal and Replacement Fund (Transmission)		ĸ					920		867,040	887,04		387,040	887,04			887,040
Total Amuel Expense (s)         S	Ronewal and Replacement Fund {Treatment Plant} <sub>(13)</sub> Totai R & R Fund	2.5%						950	275	887,040	687,04		387,040	687.04		040	887,040
Total Annuel Expresse (1000 callor)       5       5       5       5       5       5       5       5       5       7       5       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7       3       7	Total Annual Expenses (5)	S	S		S	S			s	_	9	5		22,508,17	s	ŝ	23,725,002
Discontried Value         5         7:00-017         7:00-017         5         7:00-017         5         7:00-017         5         7:00-017         5         7:00-017         5         7:00-017         5         7:00-017	Totai Annual Expenses (5/000 gallon)	S			ŝ	<b>s</b> ,										7.40 S	7.22
Total Discontined Coulty         5         207/03/56D           Discont Ratio         5         207/03/56D           Annes         2         200/03/56D           Annes         2         200/03/56D           Annes         2         200/03/56D           Annes         2         200/03/56D           Annes         2         2         4/7%           Annes         2         2         4/7%           Annes         2         2         2           Annes         2	Discounted Value	s			s	ю			ŝ			\$13		15,001,75	ŝ		\$ 15,338.412
<ul> <li>Note: 2 Store Table - Store Table - Endowell/Swindland</li> <li>2 Store Table - Store Table - Store Table - Store Data - Store Table - Store - Store</li></ul>	Total Discounted Cost (1)	297,087,580															
10 Series of parments of principal and interest poid on 4.7% at 20 neurs 11 Based on 1.2% of the with assumed the of 15 wear 12 Based on 2.5% of the with assumed the of 4.0 wears 13 Total of a person discounted to 2007 follows 14 KAW hand and 0.6 M Exemption	Motes: 1. 27 mile age, gl. Stoolfdark NAV Fequest (or Documents – Elidentificandian 1. 27 mile age, gl. Stoolfdark NAV Fequest (or Documents – Elidentificandian 2. Stores and Private Canal Sensitives – Station – S2 den beh Infland to 2007 ; 2. Stores Private Canal Fernalski Canatoricino Cara 4. A are a reproduction for Probabilio Canatoricino Cara 5. A area for the Annual Canadiana 6. A mile and a stores of canado and a store and a store of the Annual 6. Electricity Interaces with the following and water and following and water and a following and store of the Annual 6. Base, Penense as 17 mile and a following and store following and store of the Annual 6. Base, Penense as 17 mile and a following and store of the Annual	f 12: Gannelt Fleming Resc at Costs New WTP 2 & M Costs New WTP	at KAW														
	<ol> <li>Senier of pointimic of principa of interact paint of on 4.7% at 10 Earest on 1.33% of the shirt neuronal like of 7.9 wents 22 Earest on 1.25% of IdA with securitied like of 4.0 wents 23 Total of Ile service accounted is 0.2077 oblians 14 KNV Annual O &amp; M.Erzenske.</li> </ol>	20 years															

Water Supply Option Analysis Louisville Water Company Louisville Water Company Option

	Basis	•	1.00	Broc	0100	UCUC	tene	2022		2023	2024	2025	2026		2027	2028	2029	2030
Phase One Capital Expenditure	e		1107				1											
Pipeline <sub>(1</sub> Kv. River Crossing	3.1% S 3.1% S	66,528,000 \$ 1,700,000	•		s		n	n	n			•	•	<b>,</b>	•	•	•	
Booster Pump Station & Storage <sub>(2)</sub> (nitiel Capital Expenditures	3.1% S	4,600,000			 S	s	<b>s</b>	<b>v</b>	, .				5					
Contingency <sub>(21</sub>	20%	14,565,600		•	-				ĸ			•			•			
Opinion of Probable Construction Cost		87,303,600			,					,	*	·						
Essements and Permitting 41	5 %5	4,360,680 \$			s	v	s	un ,	<b>s</b>	<b>5</b>		•	s	\$	v,	5	5	
Engineering, Legal, Administrative Land (4 Acres for Boosier Pump Station)	20% 2.40%	17,478,720 85,000		<b>、</b> ·	• •	, .					• •	• •						
Capital Cost	s	109,327,000 \$	-		12	\$	\$	ŝ	<b>s</b>	¢۶			s	<b>s</b>		, ,		
tssuance Cost <sub>in</sub>	1% \$	1,093,270 \$	,	,	s	\$	\$	<b>v</b>	s	\$			s	<b>1</b> 2	• <b>•</b>	•• • •	<b>s</b>	
Capitalizad Interest <sub>(s)</sub> Total Phase One Capital Expenditure	4.7% S	2.569,185			 v	s	s	s.	v  .	<b>1</b> 2			s	s  .	s  .		•>	
Less Grant																		
Totai Net Capital Cost																		
Phase Two Capital Expenditures 44 Mile 307 Parallel Transcrission Line	0,00% \$		,		5	s	8	<b>5</b>	<b>s</b>	s ,	<b>S</b>	•	ŝ	<b>v</b> >	ю	υτ	ю	
Kentucky River Crossing New booster Pump Station and storage	\$000						, ,	, .	رم  .  .	ەر . ا.			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	м м 	• • •			
Initial Capital Expenditures	,	<b>,</b>			,						•		,	·	i	U	v	
Contingency <sub>(2)</sub>	0% 5	2			s	s	s	ю	•	,		•	l9	n	•	<i>n</i>		
Opinion of Probable Construction Cost	ŝ		•		, s	10	\$	<b>s</b>	so	• <b>&gt;</b>			ŝ	\$			<b>·</b>	
Easoments and Permitting , 41	0% \$	<b>у</b>	,		\$	s	\$	<b>v</b> >	<b>.</b>	\$			s	•• 	ς, 		• <b>&gt;</b>	
Engineering, Legal, Administrative <sub>14</sub> Canitalized Interest <sub>14</sub>	£ 5		• •		•												-	
Capital Cost	6		,		s	s	<b>s</b>	s	•• •	ю			s	<b>s</b>				
Issuance Cost <sub>(3)</sub>	0% S				, . S	u s	, .	, .	v .   .	ی  .			s	<b>.</b> .	s			
ouur Fridde I wu capital Lapanatiere e					s	s	so	s	<b>v</b> 9	<b>ن</b> ه			w	23 ,	<b>s</b>		•	
Grand Fotal Capital Expenditures - Fridse Onviality 1940	,																	
Oporations and Maintenance Expenses Electricity <sub>(e)</sub>	v		322,011	\$ 347,094	\$ 373,196	ŝ	ŝ	s	57,961 \$	488,492 \$	520,224 \$	553,198	ŝ	\$	623,039 \$	659,991 S	698,359 \$	738,188
Maintenance <sub>11</sub> , Montentence <sub>12</sub> ,	2.40%		111,552	114,230 7 cofi 545	116,971 8 550 929	1 119,779 a 9,226,859		122,653 1. 9.935.650 10.6	125,597 10.678.664 1	128,611 11,457,316	131,698 12,273,077	134,859 13,127,472	14,0		141,409 14,958,560	15,838,604	16,963,987	18,036,548
Ventorecard Varier Coulis) Meter Charge		vi	22,384	23,055	10	5	5	10	S	1.09	27,529 12,952,528	28,355 5 13,843,884	s	5		30,884 \$ 10,774,383 \$	31,014 17,842,530 S	32,871 18,958,445
			7 23		s 2.37	5	\$	2.50 \$	2.58 \$	2.05 \$	2.73 \$	5 2.81	5	2.60 \$	2.68 \$	3.08 \$	3.15 \$	3.25
1000 Annua Uparaung Expuises (4)	•	•																
Debt Service - Phase Oneric	s		\$ 15,538,320	\$ 15,538,320	\$ 15,538,320	0 \$ 15,538,320	320 \$ 15,538,320	ŝ	15,538,320 \$ 1	15,538,320 \$	15,538,320	\$ 15,538,320 	0 \$ 15,538,320	\$	15,538,320 \$	15,538,320 \$	15,538,320 \$	. ,
Debt Service - Phase Two <sub>nts</sub> KRA Withdraws Fee	\$0.05		173,375	182,500 5 15 720 820	191,625	5 5 15 738 070	750 200,875 770 S 15 748,105	10	219,000 15,757,320 5 1	228,125 \$ 15,706,445 \$	237,250 \$ 15,775,570	240,375 \$ 15,784,095	5 255,500 5 \$ 15,793,820	s	264,025 15.802,945 5	273,750	282,875 \$ 15,821,105 \$	292,000 292,000
	2 336F		RR7 040	887.040			740 88			667,040	887,040	887,040		887,040	887,040	887,040	887,040	687,040
Ronowal and Roplacement Fund (Treatment Plant) 112	2.5%	and the second	887 040	RAZ OAD	887 040				887,040	887,040	887,040	887,040		687,040	887,040	887,040	687,040	887,040
	01		24	\$ 24,008.784	\$ 25,081,827	s 20	\$ 27	\$ 27		\$ 28,754,031 \$	29,015,138	\$ 30,515,610	0 \$ 31,457,701	s,	32,443,075 \$	33,473,402 S	34,550,773 \$	20,138,485
Total Annual Expension (4) Tasal Annual Expension (6000 million)	s		7.02	\$ 0.85	\$ 6.70	s	6.57 S	6.47 S	6.38 S	6.30 S	6.24	\$ 0.19	s s	G.10 S	6.13 S	6.11 S	0.11 S	3.45
			15 031 081	S 14.741.173		S 14,464,133 \$ 14,166,643	843 \$ 13,047,621	7,621 \$ 13,706,820		\$ 13,470,824 \$	\$ 13,257,048	\$ 13,040,937	ŝ	12,845,064 \$ 1	12,053,027 \$	\$ 12,469,452 \$ 12,292,987	12,292,987 \$	6,843,524
		•																
al Discounted Cost (r) > 20 Discount Rate	952'F																	
olia oina @ Satolifooi KAW Resuest for Documents - Brithvell/Svindland																		

die pipe (§) \$200(kot) KAW Request for Documents - Brukweil/Stindland
 an alm Takk - S. 2. The Bouler Putting and the second second



#### Appendix B CONSTANT 6 MGD FLOW SCENARIO SAMPLE MODEL OUTPUT



#### Appendix B-1 POOL 3 OPTION



### Water weary were Analysis Lourvile Water Company Pool Three Option

		· · · · · · · · · · · · · · · · · · ·						
	<u>8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 </u>	2005 2009	2010 2011	2012 20	13 2014	2015	2016 2	2017
Canital Extenditurys			,					
Capital curportation of the state of Plant, in	3.10% \$ 53.217.500 \$ 54.697.243	\$ 27.433.021 \$ 27.433.621	21 \$ \$ 6.425.271	5	<b>u</b> 1			
UV Drsinfoction Goals (2011) <sub>CN</sub> Raw Water Alam <sub>C2</sub>	3 10% 390.000 402.090		55					
Transmission Line (w.addf) bonagska	48,309,000 2 100 000							
Socrage Lank rst Bocster Pump Station rst	3 10% 2500 00 2577 500 c 105 507 500 5 103 311 523	1,288,750 1,288,750 5 54 155,560 5 54,155,566	50 S S 6.425.271	5	5	s		
Initial Capital Expenditures			2 22	s	5	5	5	
Treatment Plant Contingency (a) Treatment Line Contingency (a)	2014 5 11.142,500 5 11.002,207 2014 10.153 000 10.172,433 5 21.301500 5 21.002,207	017 060 2 017 050 2 017 060 2 017 050 2 017 050 2	10					
Control of Probable Construction Cost	5 127.605.000 \$ 129.674.310	5 64,987,160 5 64,687,160	\$ 0° 5 6.429,214	s	5	5	5	
Land (s)	270,000	5 334,240 \$ 394,240	5 . 5	s 	s	5	<b>s</b>	
Easoments and Permitting <sub>N</sub> i Engineering Legal, Administrative <sub>N</sub> i	5 0% 0.150 450 0.458.715 20% 25 561 600 25 994 804	12.697.432 12.097.432	32 1,285,054		- - -	- S		
Casital Cost	180.531.250	5 81,628,169 5 61,028,159			•	•		
Long Term Debt Inst	\$ 56.316,750	*			·			
Issuance Cost (	1,01% \$ 063,183 \$ 073,536 A PART	5 400.700 5 469.769 1.601.750 1.501.750	69 S 80,316 50 261,027	s . s	5	5		
Capitalized moreston Total Phate One Capital Espenditure		S 83.709.	70a S 8.372.031	5	s	s	5	
Phase Two Capital Expenditures			5	5	5	5	5	
15 KIGD Intake and Pump Station at the Unio Never 30 Male 30" Raw water main from Oteo Rever to Pool 3								
20 MGD Treatment Plant Expansion 30 mLe 30" Transmission man to Location								
Land		5	2 <u>5</u>	s	5	5	5	
Inital Capital Excenditures			5	s		s	\$	
Teeatment Plant Conlingenzy rei Transmission Plant Conlingency <sub>(1)</sub>		•						
Total Continuence								
Opinion of Probable Construction Cost	ю	s . s	s . s	s s	5	s		
Easomonts and Pormiting <sub>tos</sub>	S	s		5	۰. ۱۰.	5	s	
Enginuering, Logal, Administrative <sub>(4)</sub> Canital Cost	5 5	\$	s	5	5		5	
Lant Term Dott	60 <sup>1</sup> . S							
Issuance Cest nu	ۍ د ۲	s			\$			
Captabled Interest (13) Total Phase Two Capital Expenditure	5	\$	1.			5		
Grand Total Capital Expenditures - Phase One and Two	\$ 167,410,416	2	5 5	s	5	~   ~		
Amual Operatina Expenses WPP Operations and Maintenance Expenses Chemicals	2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485 2 485	L7	5 152,555 5 172,600 009 516 516 516 516	5 170.743 5 062.117	185.328 066.485 S 185.328 715.252	28 \$ 180.770 \$	194 331 5 749.096	169.005 707.050
Social Social Martinharco (Plant)	2.4%		. 305.050 307.20 314.573 322.12 524.445 625	314.973 329.853 551 687		354,177	362.678	371.382
Treatmont Plant Electnicity Total Annual Operations and Mainfenance Expenses	5 5 5 5 T	\$	s	\$ 2055.273 \$	s	\$ 2,206,832	\$	2314 032
Boostar Pump and Transmission Line O&M Manumence (Transmission Line)	2.4%						72.636	74.276
Bocster Pump Electricity (14)	24%	5 5	5 183,188 \$ 187,584	1 S 162.088 S	126.697 \$ 201.417	S 208.251	s 211.201 S	216.270
ictal Booster Fump and I tantamisation Court Total Operating Expenses	دن :	5	5	\$ 2247,350 \$	2301.250 \$ 2.356.527	\$ 2.413.084	2.470.508 \$	2,530,302
Total Annual Operating Expenses (\$1000 gallon)		5	· \$ 0.53 \$ 1.00	1 5 1.03 5	1.05 5 1.	1.03 \$ 1.10	\$ 1.13 \$	1.16
Other Operating Expenses Property Taxes (1)	2.41, 5 5	s. S	\$ 1,212,834 \$ 1,241,942	5 1.271.749 5	1.302.271 5 1.333.520	5 1,305,530 6 109 400	5 1.398.303 5 5 108 500 5	1,431,862
KRA WithStaval Foo <sub>141</sub>	50.05		\$ 005'691	\$ 005,501 \$	^	100° 201		
Finance 1 Froleet KAWC Cast of Capital (801's) (20 LV Cast of Cashall (800's)			-	10,172,573	15.841.121 15.509.270 1.019.620 592.788	20 15.177.419 BB 005.956	039,124	912,292 912,292 4 605,679
Muni Duct Service (20%) Inn			4,595.629 4,595.020	4,699,020				
Prose 2 Protect XAVIC Cost of Capital (80%) (22)					1	-		
num upor porter to an tag	S	5	S 22754.630 S 22.451.696	\$ 23,196.303 \$	22,868,142 \$ 22,540,713	\$ 22.214.034	5 21.808.124 5	21.663.000
Renewal and Replacement Fund Erec 720	2.6% 5	\$	\$ 2,253,928 \$ 2,253,928	\$ 2,253,628 \$	\$	S 2.253.028		2.253.928
REAL VET JUN REAL VET JUNIO	2.65			5 208.323 S	209.323 \$ 209.323 582.129 582.129	5 200.323 982.129	200.323	201-7-C
Hak (1L) (14) Total Renewal and Replacement Fund Costs (Depreciation)	1.4 Miles and the second s	No. of the second	5	\$ 3.445.381 \$	<b>"</b>	5 3.445.381		3.445.381 77.678.647
Tolaj Erpenses		5	5 28.133.645 5 27.882.640	5 28.889.043 5	1707-07 17 27 170-17	5 23.012.498	12.70 5	12.57
Total Expenses (\$/000aslion)			200	5 22.440.184 5	5 20.01	5 18.999.155	\$ 110/220/21	17.002.117
Discounted Value								
Total Discounted Cost (11) Discount Rate	5 210.517.696 4.7%							
Meteor.								
<ol> <li>Fince adjusted to reflect cost of 25 MGD Plant - Gammat Flemming Report</li> <li>Ur Faculty with Contingmers, included - Adjusted to reflect cost of 25 MGD blant - GF Report Plane 26</li> </ol>	iD triant • GF Report Page 26							
<ol> <li>33 Todo Lone 3-200 de l'Indea 2-200 de l'Additional Borinty - \$300k Gastriet, Flumma Report Padra 28 5 Goment, Flumma Report Padra 2016</li> <li>5 Goment, Flumma Russ Padra 21.</li> </ol>	mung Roport Page 28							
6 2014 of freetment Plant Expendences 7 2014 of Transmission Lune Expendences								
5 Synchand Tustimumy a Recent in neurostana of Probable Construction Cost								

Annual O & M Costs Now W TP

	5 Basis	5	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2028	2010
Cepitai Expenditures															
Intake, Pump Station, Truatmont Planton Un Disenterion Crasts (2011)	3.10% 5	53.217.500 \$	<b>s</b>	<b>5</b>	5	5	<b>.</b> .	<b>s</b>	<b>5</b> .	<b>.</b> .	ι <b>η</b> 	s		\$	
Raw Wolter Nam ca	101.0	390,000													
framsmission Linte (N. addit   Doinigs), u Storago Tanh, si	2.01 E	2,100,000													
teossia Pump Statich (s) Initial Capital Expenditures	5 500 E	100,507,500 5	s	2	- - -	ی ا	0	.			5	s	5	8	
Treatment Plant Contingentsy <sub>rel</sub> Transmission Line Contingentsy <sub>rel</sub>	20% S 20%	11,143,500 S	S	s	s	<b>s</b>	S	US.	S	ŝ	s	<b>s</b>	S	S	
Fotal Continoance	<b>у</b> 1	21.301.500		u	u									J	
Opinion of Probable Construction Cost		<ul> <li>ann'nna'.71</li> </ul>	• •	• •	~ .		n 1	• •		• •	• •				
Land (a) Easoments and Pormating (a)	2 42  2 2 62  2 2 6  2	6.390.450		'n				n	~	a	<b>n</b> 	°	<b>.</b>		
tengrooting, Legal, Agrimitistative <sub>in</sub> Caultai Cost	S	160.531.250 5		5	0		s	-	~		5		5		
Long Term Betting	60;* 2	96.318.750													
Issuance Cost ())	1.0% 5	963.1ã8 S	UN UN		s	v	\$	<b>U</b> 8	s	<b>S</b>	<b>s</b>	s	<b>S</b>	5	
Capitalized interest (1.) Total Phase One Capital Expenditure	6 50%	I۳	s	. S	s	5	S	5	5			5	5		
rous rase or certain Liperation		•													
15 MGD intake and Permo Station of the Otio River 30 Min 37 Ray work mean from Otio River to Pool 3	v	<b>.</b>	s	s	<b>s</b>	<b>s</b>	<b>5</b>	\$	<b>s</b>	5	ŝ	<b>S</b>	<b>°</b> .	<b>.</b> ,	
20 MGD Treatment Plant Expansion 20 m/s 217 Treatment on Expansion	5														
New booster pump station and states	5														
initial Capital Expenditures		5	5		5		<b>.</b>	s	5		5	<b>.</b>	s		
Toustmort Plant Contingency	\$	UN				5	<b>.</b>	<b>s</b>	5	<b>s</b>	s	s	<b>S</b>		
Transmission Plant Contingency (1) Total Centinaoncy	<del>د</del>														
Opinion of Probabie Construction Cost	\$		s.				•	5				и		s	
Easomonts and Pointating in			5	5	<b>s</b>	s	s	s					J.	ŝ	
engriconng. Legal. Administrativo (1) Casilai Cost	5			s	2	5   1		-		2	5	s		<b>S</b>	
Luta Torm Outs		60%													
Issuance Cost (rei	5	ŝ	s	<b>S</b>	s	5	5 <b>5</b>	5	S	5	55 -	• •	<b>s</b>	<b>5</b>	
Capitalized interost <sub>(13)</sub> Total Phase Two Cabital Expenditure	0	5		<b>5</b>					0  .						
Giand Total Capital Expenditures - Phase One and Two	¢,	UN				LA.	s	5	UN .		s	ы	s	2	
Annual Operatina Extenses															
WTP Operations and Maintenance Expenses Chumicals	2.4%	5			213.669 \$		2 840 422	229,425 \$	2 2 1 9 2 2 S	~	ŝ	262.250 5	5 010 852	2 605.505	270.
Labor Security Manisons (21 ers)	44 C		879.200 307.075	371.362 371.362	330,295 330,295	77-192 27-192	393 766 393 766	409-335 408-335	418,135	721 EPT	152,200	10 BH	450.749	470.783	482.091
Trostmort Plant Electricaty Total Amrual Operating and Maintenance Expenses	24%	\$	636,397 2,369,568 5	651.671 2.426.438 5	2 2494.672 S	683,326 2.544,305 5	2.605.368 S	710,519 2.667,897 5	2 731.926 5	1.	20	3.111.112 5	3.185.778 S	3.262.237 \$	3.340.
Boosisr Pump and Transmission Line O&M												1			
Maintenance (Transmission Line) Booster Pump Electricity <sub>(14)</sub>	245 245		76,059	77.884	70.754 157.465	81.008 150.124	83.628 159.871	85,635 163,765	87.690 187.637	ca//aa	91,950 175,780	170,998	184,318	168,742	UUT.FUT 272,621
Total Booster Pump and Transmission O&M	5		r		232218 5		243.409 S	249.343 \$	255.327 5	ur u	n v	274.165 5 1.145.267 5		287.472 S	264372 3.634.60
Total Americal American Second American Second American	u		1 18	121		1.27				,	,			1.62 5	1.66
Cities Oberating Eypenan	•			•		1									
Preporty Taxes (1) KRA Victoravol Feo	2.4% \$ 50.05		1,466,227 5	1.501,416 5	1.537.450 5 109.500 5	1.574,348 \$	1,012,133 5 108,500 5	1,059,825 \$	1.050.444 5	1.731.015 5	1.772.559 5	1.815.101 5 109.500 5	1,858.663 \$ 109.500 \$	1.503.271 \$	1,548,950
Phase 1 Project x AMC Cost of Control AME.			14 181 885	13 850 014	13 518 103	13 166 312						11.295.620	10,964,069	10.632.217	10,300.3
UN Cost of Capital (1001) in			885.459	858.627	831,795	604.963	151.977	751.299	124,467	697,635	670,603	112.240	617,138	520,306	563,474
Num Dott Service (20%) <sub>i i n</sub> . Phase 2 Project			4,595,629	4,595,629	4,595.029	4,595,629		4,535.029	4,040,029			670'060'4	R70'0R5'+	4/20/070/	
KAWC Cost of Capital (801s) 120 Muni Dott Service (2015) 170															
Total Other Operating Expenses	1.0		21.238.481 5	20.015.187 5	20.592.538	20.270,753 \$	10.040.854 5	19.629.802 S	10.310.703 \$	\$ 10+ 00-01	18.770.203 \$	18.460.121 S	18.145.000 5	17.830.924 S	12.922.250
Renewal and Replacethent Fund starts	361. 0		800 EVC E	ACD FAC C	100 036 6	2 253 678				ы	Ś			2.253.923 \$	2.253.5
	- 492 - 492 - 492	5 <b>2</b> 1			S 625,602	200,323	209.323 \$	209.323	208.323 \$	209.323 \$	5 EZE'80Z	209.323 5	209,323 \$	209.323	200.322
RER { iL) <sub>(12</sub> Total Renewal and Replacement Fund Costs (Degreciation)	1.3%		962.129 3.445.381 S	3.445.381 5	3,445,361 5		3.160.344.6	3.445.381 5	3.445.381 5	1.0	۱'n	3 180.214	3 145 391 5	3.45.331 5	3.445.0
Total Expenses	s	<b>s</b>	27.275.091 \$	27.013.781 \$	26.754.800 \$	26,498,230 \$	26.244.102 \$	25,992,482 \$	25.743.432 \$	25 787 224 \$ 2	25.527.568 5 3	25-290.768 5	25.055.694 S	24.826.014 5	20.002.573
Total Expenses (\$1000talion)	s	s	12.45 \$	1234 5	12.22 \$	12 10 5	11.93 \$	11.67 5	11.75 \$	11.77 \$	11.05 \$	11.55 \$	5 HF11	11.34 5	9.13
Discounted Value	s	5	2 031-083-450	15.214 299 5	14.332.017 \$	13,614,133 \$	12.878.238 \$	12,182,259 \$	\$ 105'EZ5'11	1,016.763 \$ 1	\$ 1524.354	9.864.045 5	9.334.124 \$	8.832.963 S	0.707.338
Tetal Discounted Cost (2)	310,517,695														
Discourt state	5														
es: Price adjusted to refloct cost of 25 MGD Plant - Garrett Fearing Report															
/ Ferrikty with Continuence included - Actuated to reflect cost of 25 MiCD stant - 300 foct pipe 42 5300 per foct	- GF Rejort Pade 28														
sonett Flern	na Report Pace 2a														
20% of Treatment Plant Expenditures 20% of Transmission Line Expenditures															

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#### Appendix B-2 LWC OPTION



# Water Supply Option Analyzis Louisville Water Company Louisville Water Company Option

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114 2014 2014 2014 2014 2014 2014 2014 2		2,377,300 30,511,050 4,3,813,080 4,3,813,080 2,160,660 8,702,760 4,8,110,095 5,48,110,095 5,48,110,095 5,48,110,095 6,388,733 60,388,733	2371300 30511650 7,702,700 8,702,700 8,702,700 6,702,700 5,40,110 5,40,110 5,40,110 5,40,110 5,40,120 6,0,366,733				· · · · · · · · · · · · · · · · · · ·			
20% 1 1 20% 5 1,1%	4,14,6 8,100,17,14,6 8,113,5 8,113,5 8,113,5 8,113,5 8,113,5 8,12,7 8,13,5 8,	2, 102,002,00 2, 100,001 2, 100,001 2, 100,001 2, 100,001 2, 100,002 2, 100,000 2, 100,0000 2, 100,0000 2, 100,0000 2, 100,0000 2, 100,000000000000000000000000000000000	7,302,330 43,813,960 2,100,509 6,45,200 54,810,005 54,810,005 56,388,733 56,388,733				····			
1 2 2 2 2 2 2 2 2 2 2 2 2 2	8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	43.813.680 2.160.600 8.02.706 43.2706 54.310.005 54.380.733 56.388.733	43,813,880 2,102,709 8,022,709 4,13,320 54,81,005 54,81,005 54,81,005 56,386,733 56,386,733							
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Opinion of Probable Construction Cost		S		va va			•			
Easements and Permitting Engineering, Leggi, Administrative							•			
		s					<b>s</b>	<b>сэ</b>		
Isuance Cosi (;) 0% Superior Cost (;) 5		s								
Grand Total Capital Expenditures - Phase One and Two	\$ 113,294,327		s		8	0				
ntenance Expenses	v	ю	 	\$ 172,266 94,489	\$ 176,400 \$ 96,756	180,634 \$ 99,078	184,969 \$ 101,456			
Maintenance <sub>(14)</sub> 2.40% Whatesate Water Cost <sub>(8)</sub>	s 16.950				3.657.247 18,740	3,972,964	4,002,153			
Mater Chage Total Annual Operating Expenses (\$1000 gallon)	s s			4,020,854	4,149,140	4,27	4,308,400 \$	4,528,702	4,002,803	4,800,883
Total Annual Operating Expenses (\$)	v	\$		5 1.84	¢ 1971 \$	CRI	10.7	5		
Other Operating Expenses Debi Service - Phrae One <sub>dia</sub> S	, ,		59	\$ 15,549,533	\$ 15,549,533 \$	\$ 15,549,533 \$	15,549,533 \$ 15,549,533		\$ 15,549,533 \$	S 15,549,533
Debt Service - Phate Two <sub>10</sub> KRA Wibitrane Fee Source - Annual Fee Source - Source -		* *		100,500 S 15,050,033	109,500 \$ 15,050,033	100.500 \$ 15,050,033 \$	100,500 \$ 15,050,033 \$	15,050,033	109,500	109,500 \$ 15,050,033
jolai Other Uperaunti Experies				050,275	887,040	887,040	887,040	887,040	887,040	887,040
Netwar and Replacements one transmostering Renewal and Replacement Fund (Tradmont Plant) (1). Total R & R Fund					687,040	887.040	887,040	887,040	0+0.788	887.040 21 344 057
Total Annual Exponses (\$)	· S	. s	· ·	\$ 20,039,161	\$ 20,005,222 \$	s 20,818,057 S	20.044,330 >	6.02 0.62		
Total Annual Expenses (\$1000 gailon)	5	0		300 303 24	100 100 10	14 170 873	15 538.700	14.033.542	\$ 14,353,931	\$ 13,798,838
Discounted Value 5	<b>s</b>				100'I 00'01					

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Water Supply Option Analysis Louisville Water Company Louisville Water Company Option

Burden         11         2         100000         2         2         0         2         0 </th <th>Phase One Capital Expenditure</th> <th></th> <th>66.528.00i</th> <th></th> <th>ч ,</th> <th>5</th> <th></th> <th></th> <th>s</th> <th>s</th> <th>s</th> <th><i>s</i>,</th> <th></th> <th>5</th> <th>ю</th> <th></th> <th>s</th> <th><b>v</b></th> <th>s ,</th> <th></th> <th>L2</th>	Phase One Capital Expenditure		66.528.00i		ч ,	5			s	s	s	<i>s</i> ,		5	ю		s	<b>v</b>	s ,		L2
	ripetine <sub>(1)</sub> Kv, River Crossing Booster Pump Station & Storage <sub>(2)</sub>	3.1% S	1.700,00		,   				.		.	.			   				•		
	initial Capital Expenditures		72,828,00	\$	<b>s</b>	<b>1</b> 3	,	S	v	19	s	\$	•	s	so		~	<i>с</i> я		+	
	Cantingency <sub>(2)</sub>	20%	14,565,60	0	,			•													
	Opinion of Probable Construction Cost		87,303,60	g																×.	
	Easements and Permitting Engineering, Legal, Administrative		4,360,68		<b>s</b>	<b>v</b> 		 s	ю.	\$	\$		•••	s	v)		\$	<b>v</b>			-0
	Land (4 Acres for Booster Pump Station) <sub>(5)</sub> Capital Cost		109.327.00	رہ 19	<b>v</b> > 	<b>s</b>			s	v	6	<b>v</b> >		s	<b>v</b> >	· .	\$	<b>s</b>	<b>.</b> .		
	issuance Cest <sub>er</sub>		1,093,27		<b>s</b>	s		 s	s	s	s,	<b>v</b>		\$	<b>s</b>	• •	s	<b>v</b>	<b>,</b> ,		10
	Cuprum.cza incere.c. (c) Total Phase One Capital Expenditure		112,060,45		<b>.</b>	<b>s</b>   .		, s	s	   23	s.	vi   .		s	s		s	м  ,			
1         1         2	Loss Grant Toiel Nat Cantral Crest																				
	hase Two SciPtul Expenditures 44 Mile 30° Parallel Transmission Line Kentučky River Crossing	0.00% \$		s	59	υ» ,	,				v	v)		v <b>7</b> v	ю v			s 	, .		10
	New bocster Pump Station and storage Initial Capital Exponditures			s s	s	ي ا .  .				s				5	, <b>,</b> ,		5	<b>.</b>			
	Contingency <sub>(3)</sub>			s	<b>v</b> >	<b>s</b>		S	s	s	\$	<b>v</b>		s	<b>s</b>		s	ŝ		÷	10
1         1         2	Opinion af Probabie Construction Cost	S		s	<b>v</b> i	<b>s</b>		s		is.	s.	s		\$	<b>.</b>		s	<b>v</b> >			
1         1	Easomonts and Pormitting 41			ŝ	\$	<b>v</b>		S	, v	\$	<b>\$</b>	<b>\$</b>		s	v)		\$	<b>ن</b> ه			5
0         0	ោពក្រទេកៅពនូ, Legal, Administrativo <sub>ដ</sub> េ ឧទ្ឋាដែរដែន៨ ពែវលាទនt <sub>(ស</sub>	3% 80			 	 			, .   ,		]				 	· ·		<b>را</b> ال	.		
1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1	apital Cost	v		\$	s				5	s	n	n		n	n		n	<b>n</b>	•		n
1         1         2         2         1         2         2         1         2	Issuance Cost. <sub>(1)</sub> Totai Phase Two Capital Expenditures			   v		sr   .			5			•••		\$	və -   .		s	<b>.</b>			5
1         2         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1	irand Total Capital Exponditures - Phase One and Two	s		\$	<b>s</b>	s		, sa	s			<b>1</b> 3		s	s	-	s	\$ ·			s
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1         1	otal Annual Operating Expenses (\$)	is.		n					n	0											
100300         100300<	ther Operating Expenses Debt Service - Phase One.ic;	N			\$	ŝ	15,549,533	\$ 15,549,530			\$	s								15,549,533	s
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687.040         687.040 <t< td=""><td>conowal and Replacement Fund (Transmission) <sub>(1)</sub></td><td>1.33%</td><td></td><td>88</td><td>0+0'2</td><td>687,040</td><td>887,040</td><td>887,040</td><td></td><td></td><td></td><td>67,040</td><td>687,040</td><td>88</td><td>0+0</td><td>887,040</td><td>188</td><td>040</td><td>887,040</td><td>887.040</td><td>887</td></t<>	conowal and Replacement Fund (Transmission) <sub>(1)</sub>	1.33%		88	0+0'2	687,040	887,040	887,040				67,040	687,040	88	0+0	887,040	188	040	887,040	887.040	887
	Total R & Fund			88				887,04					887,040	88	0+0.7	887,040	687		887,040	887,040	887
·         8         0.01         5         10.02         5         10.01	Total Annual Exponsos (\$)	v	Non-statement	5 21,48	\$ 21		~~	S 21,041,51	Ś	'n	۳	v.	22,609,900	27.22		22,974,605	CD1.62 8	^		705 606 67	370
S 13/20/187 S 12/27/2061 S 12/20/147 S 11/962/87 S 10/26/153 S 10/26/103 S 10/26/103 S 0/361/244 S 0/361	otal Annual Exponsos (\$(000 gailon)	s	•	s			9,95	\$ 10.0.	\$	\$	117 S		10.32			10.40	5	ŝ		10.76	
Discontined Cont.         S         2002/0001           Discontification         4.7%           Discontification         4.7%           Ten - S. Ta Ribler Schlars Contruction (B-Technicial Endowelliss-oncloud)         4.7%           Term - S. Ta Ribler Schlars Contruction (B-Technicial Endowelliss-oncloud)         4.7%           Term - S. Ta Ribler Schlars Contruction (B-Technicial Endowelliss-oncloud)         4.7%           Term - S. Ta Ribler Schlars Contruction (B-Technicial Endowelliss-oncloud)         4.7%           Term - S. Ta Ribler Schlars Contruction (B-T-Stable Contruction (B	Discounted Value	5		\$ 13,20			12.270.147	\$ 11,602,83	\$	ŝ	ŝ	ŝ	10,121,193			9,381,834		ŝ		8,383,702	
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a Teatman, Sondard an index oursed Saman construction (2), 4.7% as counting 2 vear buildout fi straumpation (3) of Carteria Cont Begins at \$1.7 in constant on the forming that and 0 is M Carteria New WTP. KAW Begins at \$1.7 in constant on the forming that and 0 is M Carteria New WTP. KAW In a strain and index in the forming of the forming of a M Carteria New WTP. KAW Same at \$1.7 in carteria of the forming of the forming of a M Carteria New WTP. KAW Same at \$1.7 in carteria of the forming of the forming of a M Carteria New WTP. KAW Same at \$1.7 in carteria of the forming of the formin	le pipe (i) \$500/look (KMV Request for Documents - Binkwell/s windland to Tank - 52. Im Booster Pume Stanko - 52. dim pedi inflated to 2007 \$5: Ga and a cealad Exercitoriza occentage of Copion of Probable Construction Cost.	Gennett Fleming Repo	ť	1																	
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	t on 2.5% of the with accumed life of 40 years of all expenses discounted to 2007 dollars Amural O & M Expenses																				