

## Chapter 6 Utilities and Infrastructure

### *Current Status:*

*Drinking Water System:* The water system in the City of Pikeville serves almost 3,000 customers. Wholesale customers include Southern, Sandy Valley and Mountain Water Districts. These utilities sell to more than 12,000 customers. The City has a 6 MGD water plant, which is sufficient to serve the existing customers, and the distribution system is in good condition. The state of the existing potable water system is extremely good. The capacity of the plant is sufficient to meet the current and future demand, and the reserve capacity with a couple of additions is satisfactory. The recommended improvements to the system will bring the service of the system to peak levels.

*Treatment Plant and Raw Water Intake:* The City of Pikeville's raw water treatment plant was constructed in 1986. This facility has a rated capacity of six (6) million gallons per day (MGD) but can only pump 4.5 with the current high service pumps and some main line restrictions with a potential for expansion to ten (10) MGD. The plant treats raw water withdrawn from the Levisa Fork. The major treatment units include flocculation, plate settling, gravity filtration, and chlorination.

*Storage Tanks:* The City of Pikeville has 18 ground storage tanks in the distribution system. Two are maintained by Mountain Water District. These tanks range in size from 30,000 to 1,000,000 gallons. The total storage capacity of the City's water system is approximately 4 million gallons including the treatment plant clearwell (1.0 M gal.).

*Booster Pumping Stations:* Due to the topographic nature of eastern Kentucky, there are fifteen pump stations in the City's system, most of which are in good condition and require no maintenance, repairs or replacement. The Peach Orchard station does need to be rebuilt above ground. The Toler Pump Station does not have adequate suction to

allow pumping conditions at the station. The demand on this pump station will increase as the Southern Water and Sewer District develops and the station should be relocated.

***Future Needs:***

***Drinking Water System:*** There are several areas that need improvement. These areas include some repairs at the treatment plant and new storage tanks in order to provide additional capacity. There are some lines in need of replacement of PVC line with ductile iron pipe. The Toler pump station relocation at Cedar Creek is needed to prevent a low suction pressure problem.

***Treatment Plant and Raw Water Intake:*** The completion of the telemetry system allows remote monitoring and operation of the network of tanks and pump stations. The remaining two sites that need telemetry are Hurricane Creek master meter and Sandy Valley pump station. The three newest tanks (Keyser and Cedar Creek and Quail Ridge) were fitted with telemetry systems during construction. In addition, funding to equip three additional tanks (Bob Amos, Peach Orchard, and Town Mountain) has been procured. The additional site instrumentation and system hardware and software are still needed to complete the system and make it operational.

The treatment plant currently disposes of its sludge at the Lodestar Chaparral tipple at Marion's Branch. Since the current sludge disposal method will not be available as a permanent solution, a sludge press and discharge line need to be added to the plant. The dewatered sludge could then be placed in drying beds or placed in a landfill. The sludge dewatering facility recommended in this report includes a ½ meter sludge press complete with feed pump and polymer system housed in a 20 foot x 16 foot masonry block building. A six inch PVC discharge line will need to be constructed to the river. This will require a jack and bore crossing for the road and railroad, adding significantly to the overall cost.

***Storage Tanks:*** As a result of the increased development in the Wal-Mart area, the development of the Coal Run area, and development on South Mayo Trail, the demand for water in this area has increased. The addition of a 500,000-gallon tank at Quail Ridge has helped, but two additional 500,000-gallon tanks are needed to increase the storage capacity in these areas. Also, the existing 30,000-gallon tank at Quail Ridge should be replaced with a 100,000-gallon tank to adequately serve the needs of that area. The two additional tanks should be placed at the Island Creek and South Mayo Trail Areas. The addition of these three water storage tanks will improve pressure and volume to the Southern and Sandy Valley Water Districts.

Many of the tanks in the City's system require maintenance. This maintenance consists of sandblasting and painting both interior and exterior of the tanks. A maintenance program for the tanks has never been followed. Table 6-1 lays out a maintenance

**TABLE 6-1: Water Storage Tank Summary**

No.	Tank Location	Interior Type	Size (gal)	Constructed	Last Maint.	Maint. Due	Last Maint. Cost	YR 1	YR 2	YR 3	YR 4	YR 5
1	Peach Orchard	painted	100,000	1960s	1999	2009	\$20,000					x
2	Road Fork #1	painted	600,000	1972	1992	2005	\$ 45,000	x				
3	Road Fork #2	glass lined	1,000,000	1992	N/A	N/A	N/A					
4	Poor Farm Hollow	painted	100,000	1980	2002	2009	\$35,000					x
5	Foxcroft Subd'n	painted	100,000	1981	2004	2009	\$45,000					x
6	Toler Gap	painted	200,000	1985	1994	2006	\$ 32,500		x			
7	Harolds Branch	painted	100,000	1972	1993	2006	\$ 22,600		x			
8	Ratliffs Creek	painted	100,000	1972	1993	2008	\$ 18,100				x	
9	Smith Hill #1	painted	300,000	?	1994	2007	\$ 37,900			x		
10	Smith Hill #2	painted	300,000	?	1990	2005	\$ 24,000	x				
11	Keyser	glass lined	200,000	1998	N/A	N/A	N/A					
12	Quail Ridge	painted	30,000	1979	1997	2008	\$28,000	x			x	x
12a	Quail Ridge	?	500,000	2004/5	?	N/A	N/A					
13	Cedar Gap	glass lined	100,000	1992	N/A	N/A	N/A					
14	Chloe Gap*	painted	200,000	1986	?	N/A	N/A	Maintained by Mountain Water District				
15	Lovers' Leap	painted	100,000	1995	?	2007	?			x		
16	Town Mountain*	painted	500,000		?	N/A	N/A	Maintained by Mountain Water District				
17	Sandy Valley	concrete	500,000	?	N/A	N/A	N/A					
18	Cedar Creek	glass lined	200,000	?	N/A	N/A	N/A					

program for the water storage tanks for the City. The maintenance program will prevent further deterioration of the tanks in the system and thus prevent the large cost associated with tank replacement. The tanks should be inspected and maintained as needed on a 5-year schedule as shown in Table 6-1 to ensure continued service and maximum life span from these tanks. The existing glass lined tanks in the system do not require the same maintenance as the steel tanks.

*Line Replacements and Extensions:* The City of Pikeville water distribution system includes approximately 62.4 miles of pipe with diameters ranging in size from 2 inches to 16 inches in diameter. This report recommends a total of 12 water line projects: one service extension along North Mayo Trail and eleven projects to replace existing PVC pipe with ductile iron. The Wal-Mart area is fed water through a single river crossing located at the Pauley Bridge. The North Mayo Trail extension will provide an additional river crossing to the newly developed area. The interruption of water service should be essentially eliminated. The relocation of the master meter for Sandy Valley Water District is also recommended.

The eleven line replacement projects are recommended to upgrade the existing PVC pipe with ductile iron. The City has required in recent years that all waterline projects be constructed with ductile iron pipe. In years past the distribution system was constructed using PVC pipe. PVC pipe has a shorter life expectancy than ductile iron, but is normally cheaper to install than ductile iron pipe.

<b>TABLE 6-2: Water Line Replacement Projects</b>		
<b>Description</b>	<b>Unit</b>	<b>Estimated Cost*</b>
Quail Ridge Subdivision	3700 LF	\$ 103,400.00
South Mayo Trail (6-inch)	8,000 LF	\$ 214,500.00
Scott Avenue (6- and 8-inch)	2400 LF	\$ 96,800.00
Town Mountain Road (8-inch)	3200 LF	\$ 95,920.00
Chloe Road (including Melvina Drive; 8-inch)	7700 LF	\$ 218,900.00
Walters Road (6-inch)	4000 LF	\$ 99,000.00
Kati Street (Cedar Gap Subdivision; 6-inch)	1750 LF	\$ 49,500.00

<b>TABLE 6-2: Line Replacement Projects</b>		
<b>Description</b>	<b>Unit</b>	<b>Estimated Cost</b>
Foxcroft Subdivision (6-inch)	8000 LF	\$ 192,500.00
Harold's Branch Road (6-inch) Harold's Branch (8-inch)	6500 LF 6500 LF	\$ 347,600.00
<b>TOTAL LINE REPLACEMENTS</b>		<b>\$1,418,120.00</b>

\* Costs include cost of valves and connections

*Booster Pumping Stations:* A list of all pump stations is provided in Table 6-2.

<b>TABLE 6-3: Water Booster Pump Station Summary*</b>			
<b>No.</b>	<b>Location / Name</b>	<b>No.</b>	<b>Location / Name</b>
1.	Harold's Branch	8.	Peach Orchard needs rebuilt above ground
2.	Foxcroft Subdivision	9.	Poor Farm Hollow (Bob Amos Park)
3.	Chloe Gap	10.	Cedar Gap
4.	Lover's Leap (Chloe Ridge)	11.	Toler
5.	Ratliff's	12.	Northmonte
6.	Quail Ridge	13.	Town Mountain
7.	Cedar Creek	14.	Bowles Addition
		15.	Sandy Valley Pump Station

\* Information taken from 1999 Capital Improvements Study

The pump stations are in good condition and no maintenance, repairs or replacement are recommended at this time with the exception of the Peach Orchard station that needs to be rebuilt above ground. The relocation of the Toler Pump Station is a recommendation of this report. The pump station is located in such a way that the suction pressure at the station is inadequate to provide satisfactory pumping conditions at the station. The demand on this pump station will increase as the Southern Water and Sewer District develops. The station should be relocated to the originally design location

A list of each project, the estimated construction cost, and the 5-year implementation schedule is provided in Table 6-4. These projects were subjectively prioritized based on the anticipated benefit and need for the improvement. The estimated total construction cost for all proposed Drinking Water System Improvements projects is \$4,036,370.

**TABLE 6-4: PROPOSED DRINKING WATER SYSTEM IMPROVEMENTS**

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Subtotal</u>	<u>Estimated Construction Cost</u>
<b>Treatment Plant and Raw Water Intake</b>				
1	Sludge Dewatering Facility w/Feed Pumps Polymer System 20'x16' Block Building 6" PVC Discharge Line Jack and Bore Encasement			\$300,000.00
<b>New Storage Tanks (See Note 1)</b>				
2	Replacement Quail Ridge Tank (Tank Only)	100,000 GAL		\$110,000.00
3	Coal Run Tank	500,000 GAL		\$297,000.00
4	Island Creek Tank	500,000 GAL		\$297,000.00
5	Yorktown Tank	500,000 GAL		\$297,000.00
<b>Line Replacement/Extensions</b>				
6	North Mayo Trail Extension (Ratliff Hts. Dr. to Sandy Valley Line) - 8" Valves and Connections Bore and Encase	5500 LF  300 LF	\$127,050.00 \$11,000.00 \$33,000.00	\$171,050.00
7	Quail Ridge Subdivision PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Pavement Replacement Tapping Saddles & Service Connections	3700 LF  4 3700 LF 27	\$85,800.00 \$17,600.00 \$4,400.00 \$61,050.00 \$8,910.00	\$177,760.00
8	South Mayo Trail 6" PVC Line Replacement (Rainbow Ln. to Lanks Branch Rd.) Valves and Connections Relocate/Reset Fire Hydrant Pavement Replacement Bore and Encase Tapping Saddles & Service Connections	8000 LF  10 5000 LF 200 LF	\$176,000.00  \$38,500.00 \$11,000.00 \$82,500.00 \$22,000.00 \$19,800.00	\$349,800.00
9	Scott Ave. (Downtown) 6", 8" PVC Line Replacement (Leak Testing Not Included) Valves and Connections Pavement Replacement Open Cut Encase Tapping Saddles & Service Connections	2400 LF   300 LF	\$52,800.00  \$44,000.00 \$55,000.00 \$16,500.00 \$16,500.00	\$184,800.00

**Table 6-4 (Continued)**

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Subtotal</u>	<u>Estimated Construction Cost</u>
10	Town Mountain Road 8" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrants Bore and Encase Pavement Replacement Tapping Saddles & Service Connections	3200 LF   4 30 LF 200 LF	\$73,920.00 \$22,000.00 \$4,400.00 \$3,300.00 \$4,400.00 \$11,550.00	\$119,570.00
11	Chloe Rd. (incl. Melvina Dr.) 8" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Open Cut Encase Pavement Replacement Tapping Saddles & Service Connections	7700 LF   18 60 500	\$169,400.00 \$49,500.00 \$19,800.00 \$6,600.00 \$11,000.00 \$21,450.00	\$277,750.00
12	Walters Rd. 6" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Pavement Replacement Tapping Saddles & Service Connections	4000 LF   4 400 LF	\$88,000.00 \$11,000.00 \$4,400.00 \$8,800.00 \$3,300.00	\$115,500.00
13	Mays Branch Rd. 6" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Bore and Encase Pavement Replacement Tapping Saddles & Service Connections	1750 LF   3 50 100	\$38,500.00 \$11,000.00 \$3,300.00 \$5,500.00 \$2,200.00 \$4,950.00	\$65,450.00
14	Kati St. (Cedar Gap Subdivision) 6" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Pavement Replacement Tapping Saddles & Service Connections	4900 LF   2 100	\$107,800.00 \$16,500.00 \$2,200.00 \$2,200.00 \$6,600.00	\$135,300.00
15	Foxcroft Subdivision 6" PVC Line Replacement Valves and Connections Relocate/Reset Fire Hydrant Bore and Encase Open Cut Encase Tapping Saddles & Service Connections	8000 LF   6 150 LF 80 LF	\$176,000.00 \$16,500.00 \$13,200.00 \$16,500.00 \$4,400.00 \$3,300.00	\$229,900.00

**Table 6-4 (Continued)**

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Subtotal</u>	<u>Estimated Construction Cost</u>
16	Harold's Branch Rd. - 6" PVC Line Replacement	6500 LF	\$143,000.00	
	8" PVC Line Replacement	6000 LF	\$138,600.00	
	Valves and Connections		\$66,000.00	
	Relocate/Reset Fire Hydrant	18	\$39,600.00	
	Bore and Encase	100 LF	\$11,000.00	
	Tapping Saddles & Service Connections		\$14,850.00	
				\$413,050.00
17	Cedar Creek Pressure Upgrade			
	6" D.I. Water Line	800 LF	\$1,760.00	
	1" Copper Water Line	280 LF	\$3,080.00	
	Tap ex. 1" water line	8	\$550.00	
	Fire Hydrant	1	\$1,650.00	
	Tie to ex. meter	16	\$1,100.00	
	Pavement Replacement		\$3,300.00	
				\$11,440.00
<b>Pump Stations</b>				
18	Relocate Toler Pump Station (See Note 3)			\$99,000.00
19	Repaint Existing Tanks	10		\$385,000.00

**TOTAL WATER SYSTEM IMPROVEMENTS COST : \$ 4,036,370.00**

All costs presented hereon are the opinion of the engineer, based on professional experience and judgement. They by no means imply a guaranteed maximum cost to the owner, but rather are intended to provide a general budget figure to be used primarily in the comparison of alternatives.

## ***Sanitary Sewer System:***

### ***Current Status:***

*Pump Stations:* The collection system includes 10 pump stations and one siphons as shown in Table 6-5. The Keel Addition pump station, the Bowles Addition grinder pump station and the Pauley Addition pump stations have recently been replaced or rehabilitated. The rehabilitation of the Plant Influent Station No. 7 was begun in 1996 with the redesign of the pump station and river crossing rehabilitation but this project was not implemented.

*I & I Reduction:* Infiltration and Inflow (I & I) of storm water can be a significant source of additional flow in older sewer systems, reducing capacity and increasing treatment costs. Infiltration is water that enters underground service connections through cracked or deteriorating pipes, manhole walls, and other system defects. Similarly, inflow is water discharged into the system from sources such as roof drains, manhole covers, and abandoned service connections.

*Treatment Plant:* Sewerage is treated at the City's 2 MGD Extended Aeration Plant that was completed in 1991. This plant currently treats approximately .75 MGD and operates at 50% capacity. The plant is relatively new and is in excellent condition, although many of the air lines are severely corroded and need to be replaced.

*Future Needs:* The city treatment plant is relatively new and in good condition. The proposed projects will decrease maintenance costs for the plant and increase its reliability. The rehabilitation of Pump Station No. 7 has been needed for several years and should be a top priority. The proposed collection system extensions will increase the service area to include virtually all areas that can reasonably be served. Improvements that should be made to the collection system and treatment plant fall into four categories: rehabilitating existing pump stations; controlling infiltration and inflow (I & I); providing new service; and improvements to the existing treatment plant, and other system maintenance upgrades.

*Pump Stations:* Two of the 10 pump stations are still in need of repair or rehabilitation due to age: the Plant Influent (No. 7), and Cedar Creek pump stations. Of these, the Plant Influent Station is the highest priority. This station collects all the flow from the City and pumps it across the river to the treatment plant. This plant must be kept in reliable operating condition and sized to system demands. The rehabilitation of the Plant Influent Station must be implemented. This project will cost approximately \$261,000 to complete and should remain a top priority. Approximately \$77,000 should be budgeted for rehabilitating the Cedar Creek pump station.

<b>TABLE 6-5: Pump Station / Siphon Summary</b>		
No.	Name / Location	Pump Discharge (GPM)
<b>PUMP STATIONS</b>		
1	Keel Addition	400
2	Pauley Addition	100
3	Yorktown	130
4	Poor Farm	1015
5	Cedar Creek	
6	Huffman Supply	
7	Johnson Motors (Lift Stn # 7)	980
8	Best Western	320
<b>GRINDER PUMP STATIONS</b>		
9	Bowles	
10	State Electric	27.5
<b>SIPHONS</b>		
11	Best Western	

*I & I Reduction:* The City should review and update the existing I & I Reduction Program and implement its recommendations. The Bowles Addition is in need of a comprehensive study to identify and eliminate excessive I & I in this area. Some measures that may be included in the I & I reduction program are smoke testing, installing run-time meters as part of pump station rehabilitation, and the purchase of television equipment for pipeline inspection. The implementation of a successful I & I identification and reduction program will preserve the additional capacity of the treatment plant and reduce treatment costs.

There are two options in implementing an I & I program: contracting the service to a private company to study and report; or purchasing the necessary equipment to allow Veolia Water to perform this work. The cost to contract the cleaning and remote T.V. camera inspection of the approximately 8,500 LF of lines that are suspect would cost approximately \$20,000. Conversely, the camera equipment can be purchased for only slightly more than this. The city already owns and operates sewer cleanout equipment. The purchase of the required equipment will provide the best long- term solution to this problem. Lines can be inspected elsewhere in the system as future areas continue to age and deteriorate over time.

*Service Extensions:* The existing service area should be expanded to include the following areas where sanitary sewer is not currently available. See Exhibit B for illustration.

- Cedar Gap Subdivision (approximately 22 houses)
- Yorkwood Subdivision (approximately 9 houses)
- Foxcroft Subdivision (approximately 6 houses)
- Island Creek Road (approximately 25-30 houses)
- Town Mountain Road (approximately 5 houses)
- Ratliff's Creek Road (approximately 12 houses)
- Johnson Hollow (approximately 4 houses)

The extension for service to Ratliff's Creek will open up sewer service to Buckley's Creek, a large tract of property just outside the City boundaries. The new service being constructed to the U.S. 23 Shelbiana Bridge opens the area on U.S. 460 to sewer service.

A potential takeover of the Mossy Bottom Sewer System could bring 400 additional customers to the City of Pikeville. This takeover would allow for the extension of service to the northern parts of the county including the airport property.

*Treatment Plant:* The plant is relatively new and is in excellent condition, although many of the air lines are severely corroded and need to be replaced. The following plant improvements are intended to improve reliability and reduce maintenance.

- The addition of a grit removal system and headworks modification to include a self cleaning bar screen
- An upgrade of the septic dumping station to measure inflow
- The installation of backup generators for the treatment plant and Pump Station No. 7.
- Coatings for the clarifiers and all metal parts to help extend the life
- Air line replacements of severely corroded lines

A list of each project, the estimated construction cost, and the 5-year implementation schedule is provided in Table 6-6. These projects were subjectively prioritized based on the anticipated benefit and need for the improvement. The estimated total construction cost for all proposed Sanitary Sewer projects is \$2,975,880.

**TABLE 6-6: PROPOSED SANITARY SEWER IMPROVEMENTS**

<u>Item No.</u>	<u>Description</u>	<u>Length</u>	<u>Number of Residences</u>	<u>Subtotal</u>	<u>Estimated Construction Cost*</u>
<b>Pump Station Rehab/Replacement</b>					
1	Rehab Lift Sta. No. 7 and River Crossing				\$261,800.00
2	Rehab Cedar Creek Station Replace 8" Collector w/ 12" PVC (See Note 1)	700 LF		\$33,000.00 \$44,000.00	\$77,000.00
<b>I &amp; I Reduction (See Note 2)</b>					
3	Sewer Inspection Camera (4"-10" Pipes) (See Note 3) Black/White Camera & Locator Kit Color Camera & Locator Kit			\$8,800.00 \$11,550.00	\$20,350.00
<b>Service Extensions</b>					
4	Cedar Gap Subdivision Island Creek Dr. - 4" FM Kati St. - 8" Gravity Nightingale Ln. - 8" Gravity Manholes Pump Stations (200 GPM) 8"x8"x6" PVC Tee Wye	1800 LF 2000 LF 1200 LF 11 22	13 9	\$23,760.00 \$132,000.00 \$79,200.00 \$24,200.00 \$66,000.00 \$2,420.00	\$327,580.00
5	Yorkwood Forrest Dr. - 8" Gravity 10 Manholes Bore & Encase for 8" 8"x8"x6" Tee Wye	3350 LF 10 100 LF 9	9	\$221,100.00 \$22,000.00 \$16,500.00 \$990.00	\$260,590.00
6	Foxcroft Subdivision 8" Gravity (Foxcroft Ln.) Manholes 8"x8"x6" PVC Tee Wye Bore and Encase for 8" Pump Station 4" Force Main	2500 LF 20 6 100 LF 200 LF	6	\$165,000.00 \$44,000.00 \$660.00 \$16,500.00 \$66,000.00 \$3,300.00	\$295,460.00
7	Island Creek Road 8" Gravity 4" Force Main Pump Station (200 GPM) Manholes 8"x8"x6" Tee Wye HDPE River Crossing w/Anchors	3150 LF 500 LF 10 25-30 400 LF	25-30	\$207,900.00 \$6,600.00 \$66,000.00 \$22,000.00 \$3,300.00 \$66,000.00	\$338,000.00
8	Ratliff's Creek Sewer Extension 8" Gravity (Ratliff's Creek) Manholes 8"x8"x6" PVC Tee Wye Bore and Encase for 8" Pump Station 6" Force Main	3100 20 6 100 LF 1 3800	6	\$300,000.00 \$44,000.00 \$660.00 \$16,500.00 \$66,000.00 \$60,000.00	\$487,160.00

**Table 6-6 (Continued)**

<u>Item No.</u>	<u>Description</u>	<u>Length</u>	<u>Number of Residences</u>	<u>Subtotal</u>	<u>Estimated Construction Cost*</u>
9	Johnson Hollow - 8" Gravity	3350 LF	9	\$221,100.00	
	10 Manholes	10		\$22,000.00	
	Bore & Encase for 8"	100 LF		\$16,500.00	
	8"x8"x6" Tee Wye	9		\$990.00	
					\$260,590.00
10	Town Mountain Road				
	8" Gravity	1000 LF	5	\$66,000.00	
	Manholes	4		\$8,800.00	
	8"x8"x6" Tee Wye	5		\$550.00	
					\$75,350.00

**Treatment Plant**

11	Grit Removal System				\$275,000.00
	Headworks Modification				\$110,000.00
12	Flow Monitors for Septic Dumping System				\$22,000.00
13	Backup Generators for Treatment Plant and Lift Station No. 7			\$110,000.00	
	Outbuildings, if required			\$38,500.00	
	Land Acquisition (Fletcher and Hall)			\$16,500.00	\$165,000.00
14	Corrosion Resistant Coating				\$125,000.00
15	Air line replacement				\$125,000.00

**TOTAL SEWER SYSTEM IMPROVEMENTS COST : \$ 2,975,880.00**

All costs presented hereon are the opinion of the engineer, based on professional experience and judgement. They by no means imply a guaranteed maximum cost to the owner, but rather are intended to provide a general budget figure to be used primarily in the comparison of alternatives.

\* Construction and material cost only - does not include design, inspection, contingencies, etc.

**Natural Gas System:**

**Current Status:**

The City obtains natural gas from 10 different suppliers. This supply system includes 21 well heads and taps to two major Columbia Gas transmission lines. Table 6-7 is a partial list of gas wells and taps by supplier name.

<b>TABLE 6-7: Gas Well Summary **</b>			
<b>No.</b>	<b>Supplier</b>	<b>Well Name</b>	<b>Meter Location</b>
*1.	Alert Oil & Gas / Kinzer	Scott Addition Well	Scott Addition, N. of Pikeville
*2.	Alert Oil & Gas/Kinzer	Sewer Plant Well	At Sewage Treatment Plant near Pauley
*3.	Roberts & Holcomb	Well No. 2	On Lower Chloe Creek Road, at Bill Syck Residence.
*4.	Roberts & Holcomb	Well No. 6	On Lower Chloe Creek Road, at Freewill Baptist Church
*5.	Roberts & Holcomb	Well No. 7	On Lower Chloe Creek Road, at Bob Amos residence
*6.	Roberts & Holcomb	Well No. 14	On ridge between Chloe Creek and Left Fork of Harolds Branch
7.	Riley & Scott	Yost Well	In Coal Hollow, 1.5 miles south of Inner Loop intersection
8.	Riley & Scott	City Park Well	Behind Chamber of Commerce on Huffman Avenue
*9.	Pike Co. Collieries	Harolds Branch Well	On Left Fork of Harolds Branch
*10.	Pike Co. Collieries	Bowling Alley Well	On South Mayo Trail, behind Starlite Bowling Lanes
11.	Chuck Richner	R. T. Greer Well	At upper end of Derby Street
*12.	Bob Hurt	Bob Hurt Well	On Road Fork of Upper Chloe Creek, approx. 0.4 mile north of Road Fork/ Upper Chloe intersection
13.	Kinzer/Columbia Gas	Bypass Road Wells	On Bypass Road, across from KYDOT District 12 office
*14.	Kinzer	Powderhouse Hollow Well	In Powderhouse Hollow of Ferguson Creek
15.	Columbia Gas Tie-In	Lower Bridge Station	On Bypass Road, just east of Lorraine St.
16.	Columbia Gas Tie-In	S. Mayo Trail Station	On South Mayo Trail in Yorktown, just south of Keene Auto Sales
*17.	C. D. & G	?	Supply in Pike Collieries area of Harolds Branch
18.	Interstate	?	
19.	Elliott	Ratliff's Creek	Feed to Ratliff's Creek and Feed toward Wal-Mart

20.	Elliott	Ratliff's Creek	Feed to Ratliff's Creek and Feed toward Wal-Mart
21.	Elliott	Ratliff's Creek	Feed to Ratliff's Creek and Feed toward Wal-Mart
* Indicates well not in service at this time			
** Information taken from 1999 Capital Improvements Study			

***Future Needs:***

The city gas distribution system requires several safety related improvements, including the replacement of corroding steel lines. These projects should receive priority in funding to ensure the safety of the public as well as the system maintenance personnel. The remaining proposed projects will increase system performance and reduce system losses. The reduction of these losses will reduce operation costs and should be considered an investment that will pay for itself. Needed improvements to the gas distribution network fall into three categories: replacement of deteriorating sections of steel line with high density polyethylene (HDPE) to improve safety; extending gas lines to new service areas; and improving system performance.

*Steel Pipe Replacement:* There are two locations in the system where corroding steel pipe poses a safety concern: Chloe Road and South Mayo Trail. These sections total more than 28,000 LF of steel pipe that should be upgraded to HDPE pipe. Given that areas along South Mayo Trail are densely developed, the replacement of gas lines should be done concurrently with the water line replacements recommended above. This will reduce restoration costs and minimize the time local residents and businesses access will be impacted by construction.

*New Service:* The existing service area should be expanded to provide natural gas to the following four areas within the city currently without service.

- Cedar Creek Subdivision (approximately 77 houses, )
- Foxcroft Subdivision (approximately 6 houses)
- Quail Ridge Subdivision (approximately 20 houses)

*Increase System Performance:* The performance and reliability of the existing system can be increased in the area of the Big Sandy Regional Mall by extending the existing four inch gas main near Wal-Mart along Cassady Boulevard to create a closed loop. This will boost system pressure in this area and allow line breaks or leaks to be isolated without disrupting service. The cost of this improvement will be approximately \$44,000.

The current system operates with an approximate system loss of 6%. The difference between the amount of gas measured at the well head or tap and the total of all meters can be attributed primarily to leaks (e.g. corrosion of metal pipes) and inaccurate

metering. Replacement of deteriorating steel lines as previously discussed will help reduce the amount of gas lost from underground lines, reducing operating costs and increasing public safety.

This report recommends controlling losses by two methods: purchasing additional meters to be used to verify flows in various areas, and the replacement of older meters with more accurate electronic meters. The temporary installation of 5 to 10 additional meters at various points in the system will allow Veolia Water to verify usage and isolate underground leaks or erroneous meters. Veolia Water hopes to reduce the 6% loss (of total gas purchased from suppliers) to only 3%. The 1997 Combined Financial Statement for Pikeville estimates \$800,000 in gas purchases for 1999. A ten percent loss will cost the city \$80,000. Reducing the gas loss to 3% can potentially save over \$50,000. The purchase of approximately five additional meters in each of the first two years should easily pay for itself in the short term, and result in long-term savings for the City.

Securing the lowest possible gas prices must remain a priority for the City. Currently, the City uses a Broker to purchase gas at the best possible price. This practice should continue, but the additional step of exploring the possibility of purchasing gas in bulk during the off season and storing it until it is needed during the winter months should be examined.

A list of each project, the estimated construction cost, and the five-year implementation schedule is provided in Table 6-8. These projects were subjectively prioritized based on the anticipated benefit and need for the improvement. The estimated total construction cost for all proposed Natural Gas System Improvements projects is \$2,232,050.

**TABLE 6-8: PROPOSED NATURAL GAS SYSTEM IMPROVEMENTS**

<u>Item No.</u>	<u>Description</u>	<u>Length</u>	<u># Residences</u>	<u>Subtotal</u>	<u>Estimated Construction Cost*</u>
<b>Steel Pipe Replacement</b>					
1	Chloe Road - 4" HDPE	8600 LF			\$530,200.00
2	South Mayo Trail - 4" HDPE Pavement Replacement Restore Business Entrances & Lanscaping	19500 LF		\$440,000.00 \$321,750.00 \$220,000.00	\$981,750.00
<b>New Service</b>					
3	Cedar Creek Subdivision Cedar Creek Rd. - 4" HDPE Main Honeysuckle Ln - 2" HDPE Laurel Lane - 2" HDPE Valves & Connections Bore and Encase River Crossing	10300 LF 800 LF 400 LF 40 LF 800 LF	53 (Existing) 18 6	\$170,500.00 \$13,200.00 \$11,000.00 \$55,000.00 \$4,400.00 \$132,000.00	\$386,100.00
4	Foxcroft Lane - 2" HDPE Valves & Connections Bore and Encase	1500 LF 40 LF	6	\$24,750.00 \$11,000.00 \$5,500.00	\$37,500.00
5	Quail Ridge Subdivision 2" HDPE Bore & Encase Valves & Connections Pavement Replacement	4800 LF 100 LF		\$63,250.00 \$11,000.00 \$16,500.00 \$88,000.00	\$178,750.00
<b>Improve System Performance</b>					
7	Cassady Blvd. Loop Closure - 4" HDPE Connections and Valves		1600 LF	\$44,000.00 \$4,400.00	\$48,400.00
8	Purchase Mobile Meters for Loss Detection Surveys	10			\$60,000.00
9	Telemetry System for Master Meters Add Modem to Electronic Instrumentation Computer Software (See Note 1)	(see Note 2) 15 1		\$8,800.00 \$550.00	(see Note 2) \$9,350.00

**TOTAL GAS SYSTEM IMPROVEMENTS COST \$ 2,232,050.00**

\* Construction and material cost only - does not include design, inspection, contingencies, etc.

Note 1: Cost estimates provided by Holland Supply Co.

Note 2: Meters must have been upgraded to electronic in order to add modem.

Price includes hardware only and does not include telephone service connection to each meter !

All costs presented hereon are the opinion of the engineer, based on professional experience and judgement. They by no means imply a guaranteed maximum cost to the owner, but rather are intended to provide a general budget figure to be used primarily in the comparison of alternatives.

***Utility concerns in general:***

In order to support increased development throughout the City, to make such construction affordable for developers, and to maintain the highest level of service, the City of Pikeville should ensure that all new developments have underground utilities and infrastructure services. In addition, the Downtown beautification project that relocated all utilities underground in the Historic Downtown area should be extended to adjacent historic residential neighborhoods. This will not only improve the aesthetic feel of those neighborhoods but reduce long term maintenance costs.

The Big Sandy Area Development District has several services geared toward utility and infrastructure planning, including the WRIS system, which specifically profiles water and sewer projects.

***Utilities and Infrastructure Goals and Objectives:***

*Goal: The City of Pikeville will provide comprehensive and affordable water, sewer, and gas services using modern, high-functioning, well-maintained and safe equipment and infrastructure throughout the City.*

➤ ***Water***

- Complete telemetry system for remote monitoring and operation
- Add sludge press and discharge line
- Install two additional storage 500,000 gallon storage tanks at Island Creek and South Mayo Trail
- Install a 100,0000 gallon tank at Quail Ridge
- Line projects:
  - Extend service along North Mayo Trail
  - Eleven line replacement projects to install ductile iron in place of existing PVC
- Relocate the Toler Pump Station

➤ ***Sewer***

- Rehabilitation of existing pump stations
  - Redesign pump station and rehabilitate river crossing at Plant Influent Station
  - Rehabilitate Cedar Creek pump station.
- Control infiltration and inflow (I & I)
  - Review and update the existing I & I Reduction Program and implement its recommendations including purchase of necessary equipment to enable City public works department to do so

- Extension of service to:
  - Cedar Gap Subdivision (approximately 22 houses)
  - Yorkwood Subdivision (approximately 9 houses)
  - Foxcroft Subdivision (approximately 6 houses)
  - Island Creek Road (approximately 25-30 houses)
  - Town Mountain Road (approximately 5 houses)
  - Ratliff's Creek Road (approximately 12 houses)
  - Johnson Hollow (approximately 4 houses)
  
- Treatment plant maintenance/ upgrades:
  - Addition of a grit removal system and headworks modification to include a self cleaning bar screen
  - Upgrade of the septic dumping station to measure inflow
  - Installation of backup generators for the treatment plant and Pump Station No. 7.
  - Apply corrosion resistant coating to clarifiers and all metal parts to lengthen life
  - Replace corroded air lines where severely damaged
  
- *Oil and Gas*
  - Replace deteriorating sections of steel line with high density polyethylene (HDPE) on Chloe Road and South Mayo Trail
  - Extension of service areas to four new areas
    - Cedar Creek Subdivision (approximately 77 houses)
    - Foxcroft Subdivision (approximately 6 houses)
    - Quail Ridge Subdivision (approximately 20 houses)
  - Improve system performance
    - Complete extension of existing 4-inch gas main along Cassady Boulevard to create a closed loop
    - Reduce current leakage of 6% to 3% by adding meters and replacing old meters with electronic ones.
    - Continue using a broker to secure the best gas prices
    - Look into the possibility of the City buying gas at times of lower market price and storing for future consumption
  
- *Utility concerns in general:*
  - Ensure new developments have underground utilities and services only
  - Extend area of underground utility service beyond downtown to include adjacent historic residential neighborhoods (Scott Ave, etc.)