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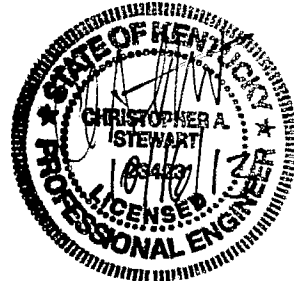
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2014-00050

PARKSVILLE WATER DISTRICT
BOYLE COUNTY, KENTUCKY
PRELIMINARY ENGINEERING REPORT
WATER SYSTEM IMPROVEMENTS PROJECT

Revised October 2013



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INTRODUCTION

This Preliminary Engineering Report will examine the proposed Water System Improvements Project for the Parksville Water District (PWD).

DESCRIPTION OF WATER DISTRICT

The Parksville Water District was created in approximately 1960. The members of the Board of Commissioners are nominated by the Judge-Executive of Boyle County and must be approved by the Fiscal Court. These Commissioners transact and administer all business of the District at its office located at 10711 Lebanon Road, Parksville, Kentucky. The District's service area is in the southwestern part of Boyle County. It includes the unincorporated communities of Parksville, Mitchellsburg, Brumfield, Forkland, Wilsonville, and Alum Springs. The District serves approximately 1700 households and based on the Kentucky Data Center's information, Boyle County has 2.38 residents per household. These figures result in a population of approximately 4,000 residents within the District. Per a Rural Development letter dated 12/28/10, the median household income in the District is below \$26,977.

EXISTING WATER SYSTEM

The Parksville Water District provides safe potable water service to approximately 1,700 customers. The system is comprised of approximately 132 miles of waterlines ranging in size from 1" to 8" and consists of four (4) water storage tanks and four (4) pump stations. There is one master meter through which the District purchases water from the City of Danville. The District purchases approximately 8,956,000 gallons per month.

The Parksville Water District's distribution system basically supplies its customers from two main trunk lines. These trunk lines are approximately three (3) miles apart, and run parallel across the District in an east/west direction. The northern trunk line begins at the master meter vault on the west side of Corporate Drive, and then runs alongside KY-34 in westerly direction approximately eleven (11) miles to US-68. The southern trunk line begins on the western side of Junction City, and then runs in a westerly direction alongside KY-37 approximately fourteen (14) miles to Forkland. The two lines are connected at various points and each has smaller lines which branch off at various locations.

The existing storage tanks are currently filled manually. PWD employees start the pumps to fill the tanks as needed throughout the day. The ice storm in February 2009 caused major damage to the District's supervisory control and data acquisition (SCADA) system. The SCADA system is now inoperable.

NEED FOR PROJECT

Currently, PWD is experiencing great difficulty in maintaining adequate water service through its Persimmon Knob tank. Specifically, the Persimmon Knob pump station (PKPS) experiences low suction pressure and is unable to operate at certain times. This issue can be resolved with water system improvements; however, due to costs and limited funding availability, these improvements must be accomplished in phases over time.

The first phase of these improvements will be accomplished in this project. Phase I consists of the construction of the Alum Springs Transmission Main from the existing KY 34 pump station, PWD's supply point from Danville's water system, along Alum Springs Cross Pike to a point near the PKPS. The proposed 10" transmission main will facilitate greater water volume and more stable water pressure availability to the PKPS. The intent is to mitigate the low suction lockout of the PKPS in certain situations, primarily when both the Parksville pump station and the KY 34 pump station are running to feed the western end of the PWD distribution system.

The next phase, to be constructed in the near future, would consist of the replacement and upgrade of the KY 34 Pump Station, as well as the upgrade of the water main along KY 34 from the pump station to Parksville. With this infrastructure in place, elimination of the PKPS can be evaluated.

In the eastern portion of the District, there is a 1" galvanized waterline serving approximately five (5) residents on Worldstown Spur Road. This galvanized line constantly leaks and disrupts the service to all the households on Worldstown Spur Road. The age, size, and material of this waterline all contribute to the problems these residents face on a daily basis.

In addition to the two problems listed above, PWD currently has approximately 1,000 feet of the southern trunk line valved off. The North Rolling Fork washed out the bank near the intersection of KY-37 and Little South Road where an existing 4" waterline was located. The waterline is now broken, exposed, and beyond repair. The section of waterline along KY-37 is key to maintaining uniform hydraulics throughout the District due to the looping network it creates.

As previously mentioned in this report, the District operates all components of the system manually. While PWD tries its best to keep the storage tanks full, the constant driving from pump station to pump station at all hours of the day and night is not sustainable. The only way an employee would know when to shut off the pump is when a storage tank begins utilizing the overflow. The funds spent on the wasted (overflow) water, manpower, and wear on the District's equipment have reached a high level. The ice storm placed PWD in an unfavorable circumstance, and that situation needs correcting.

The District further desires to understand the hydraulics of the whole water distribution system. No such hydraulic modeling is available for the District, and would need to be completed to accurately develop a master plan for future improvements, identify deficient areas and evaluate alternative solutions to known problems.

PROPOSED PROJECT

This project will be composed of four different components. The first part will address the need for the Alum Springs Transmission Main by installing 10" water main along Alum Springs Cross Pike to help mitigate the periodic low suction situation at the PKPS. This transmission main would replace the existing 6" and 4" water lines along much of its route. The exception to this may be in the southern portion of the route where many customers are connected to the existing 4" on long service lines that would be costly to replace. Should funds remain after bidding, this situation would be considered for correction, thereby eliminating all of the existing 4" and 6" lines on Alum Springs Cross Pike. This can be seen in Figure 1.

The other proposed waterline upgrade will occur on Worldstown Spur Road. As previously discussed this galvanized line has caused problem after problem, replacing it with a new 2" PVC waterline will allow the customers on this road undisturbed service while reducing the District's water loss and maintenance expenses. Please refer to Figure 2.

The second item this project will address is the KY-37 waterline washout. By installing the new 4" PVC waterline on the northern side of KY-37 (please see Figure 3), the North Rolling Fork will be completely avoided and the District's southern trunk line will be connected once again. This area, which lies on the far western side of the District, needs the loop restored to maintain desirable flow rates and pressures.

The last two parts of this project, a hydraulic study (see Figure 4) and the SCADA system, are closely tied together. The hydraulic study will model all existing features of the Parksville Water District and determine optimum pump operation cycles and water level elevations in the storage tanks. The current method, run the pumps until the tanks overflow, has resulted in a waste of the District's manpower, equipment, water, and money. The SCADA system will have a central unit at the District's office on Lebanon Road (see Figure 5). This control system will oversee all activities at SCADA remote sites, said sites will be at the four (4) pump stations, the four (4) storage tanks, a master meter, and at the control valve pit. Additionally, two (2) altitude valves will be replaced as part of this project.

TABLE 1 - COST SUMMARY

OPINION OF PROBABLE PROJECT COSTS

(See Appendix I for Details)

CONSTRUCTION

Alum Springs Transmission Main	\$375,000
Worldstown Spur Upgrade	\$ 15,000
KY 37 Washout Replacement	\$ 16,000
SCADA System	<u>\$185,000</u>
Construction Subtotal	\$591,000
	<i>USE</i>
	<i>\$600,000</i>

NON-CONSTRUCTION

Design & Preliminary Engineering	\$ 58,000
Construction Engineering & Observation	\$ 52,000
Other Engineering & Miscellaneous Costs	\$ 53,500
Legal/Admin/Land & Rights	\$ 16,000
Interest During Construction	\$ 20,000
Contingencies	<u>\$ 50,000</u>
Non-Construction Subtotal	\$249,500
	<i>USE</i>
	<i>\$250,000</i>

TOTAL ***\$850,000***

PROJECT FUNDING

This project was funded by Rural Development via a Letter of Conditions dated December 20, 2011 in the total amount of \$725,000. Of this amount, \$508,000 is loan and \$217,000 is grant.

RECOMMENDATIONS

As shown above, the revised opinion of project costs exceeds the available RD funding.

In order to mitigate this situation, the project will be bid to include alternate bid items that may be utilized to reduce the project costs.

In the event that as-bid construction costs cannot be reduced within the available funding, it is recommended that PWD request additional funding from RD after bidding, and that customer rates be adjusted accordingly at that time.

Further, it is recommended that the project move ahead, as proposed herein, as expeditiously as possible from this point, as most RD checklist items are complete.

FIGURES

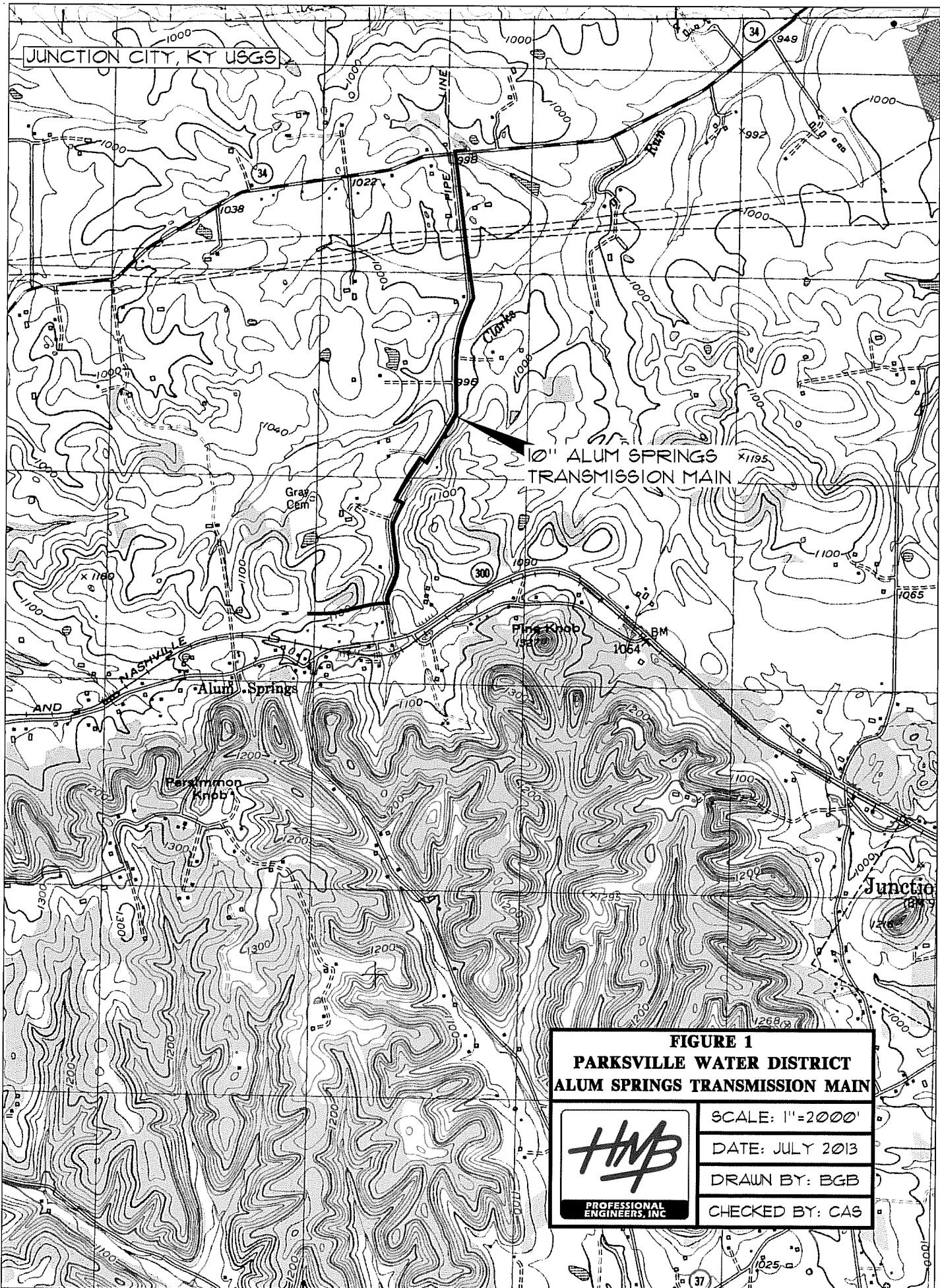
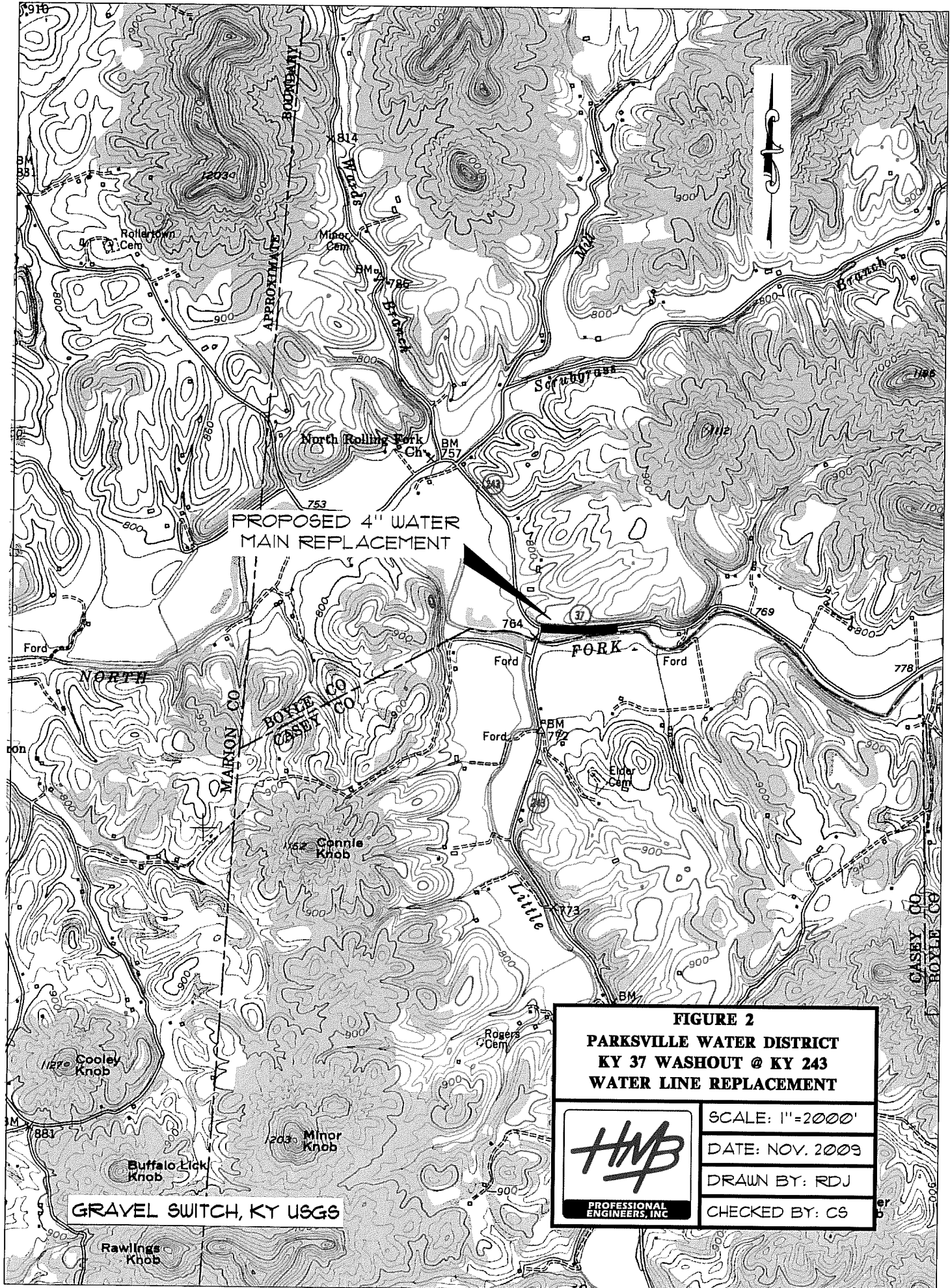



FIGURE 1
PARKVILLE WATER DISTRICT
ALUM SPRINGS TRANSMISSION MAIN



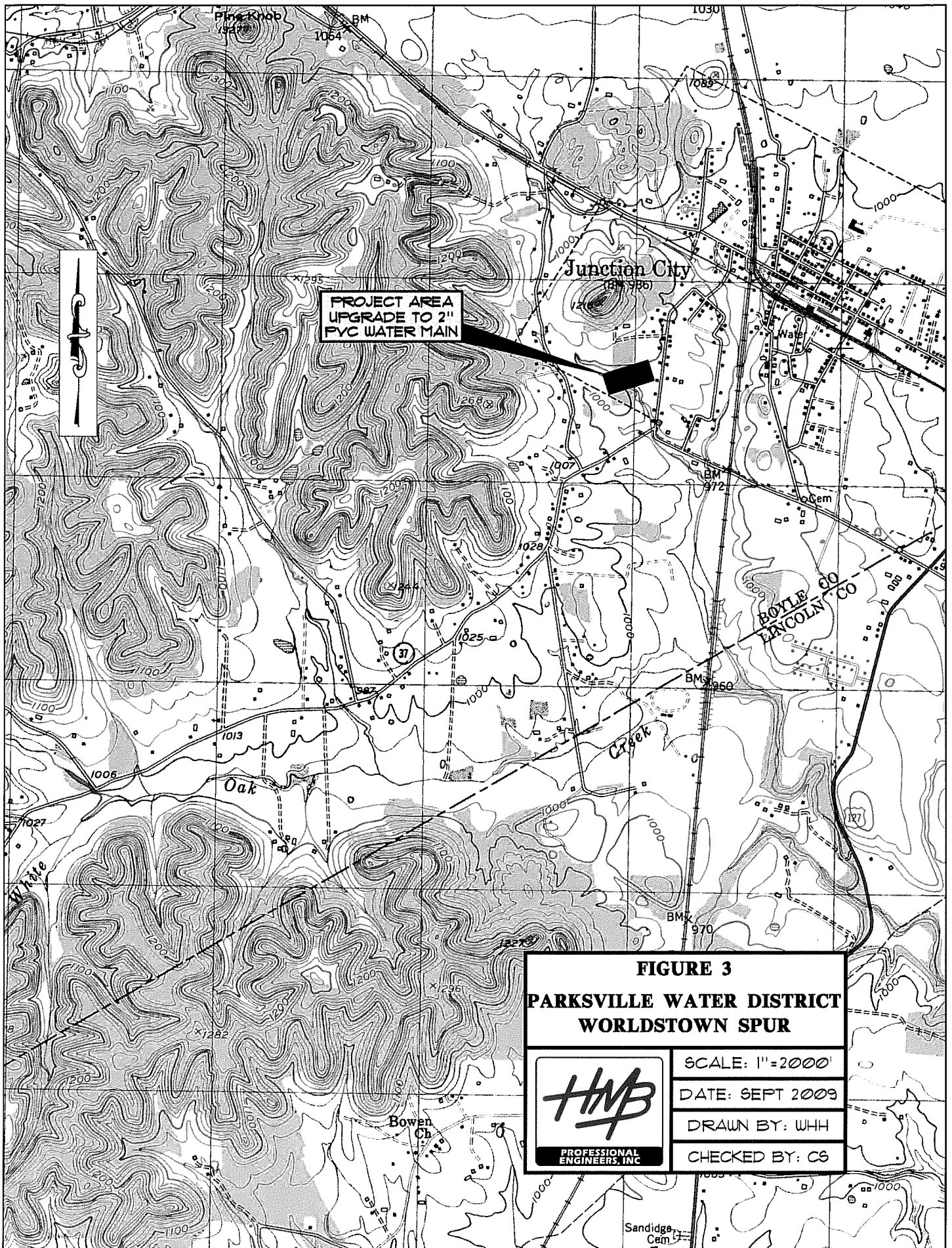
SCALE: 1"=2000'
DATE: JULY 2013
DRAWN BY: BGB
CHECKED BY: CAS



PROPOSED 4" WATER MAIN REPLACEMENT

FIGURE 2	
PARKSVILLE WATER DISTRICT	
KY 37 WASHOUT @ KY 243	
WATER LINE REPLACEMENT	
	SCALE: 1"=2000'
	DATE: NOV. 2009
	DRAWN BY: RDJ
	CHECKED BY: CS

GRAVEL SWITCH, KY USGS



PROJECT AREA
UPGRADE TO 2"
PVC WATER MAIN

FIGURE 3
PARKSVILLE WATER DISTRICT
WORLDSTOWN SPUR



SCALE: 1"=2000'
DATE: SEPT 2009
DRAWN BY: WHH
CHECKED BY: CS

GRAYEL SWITCH QUAD

MACKVILLE QUAD



PARKSVILLE QUAD

FERRYVILLE QUAD

APPROXIMATE DISTRICT BOUNDARY

WATER DISTRICT OFFICE

JUNCTION CITY QUAD

DANVILLE QUAD

**FIGURE 5
PARKSVILLE WATER DISTRICT
HYDRAULIC STUDY**



SCALE: 1"=10,000'

DATE: SEPT 2009

DRAWN BY: RDJ

CHECKED BY: CS

APPENDIX I

Detailed Opinion of Probable Cost



Parkville Water District
 Water System Improvements Project
 Opinion of Probable Cost

Project No: 4151.00
 Engineer: CAS
 Date: 5/16/2013

Alum Springs Transmission Main - Construction

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total</u>
1.	10" PVC Water Line	11,000	LF	\$13	\$143,000
2.	Tracer Wire & Warning Tape	11,000	LF	\$1	\$11,000
3.	20" Steel Casing by Bore	100	LF	\$150	\$15,000
4.	20" Steel Casing by Bore (Driveway)	50	LF	\$135	\$6,750
5.	10" Driveway Bore (Uncased)	200	LF	\$75	\$15,000
6.	12" HDPE Creek Crossing #1	1	LS	\$8,000	\$8,000
7.	12" HDPE Creek Crossing #2	1	LS	\$15,000	\$15,000
8.	12" HDPE Creek Crossing #3	1	LS	\$18,000	\$18,000
9.	12" HDPE Creek Crossing #4	1	LS	\$18,000	\$18,000
10.	12" HDPE Creek/Driveway Crossing #5	1	LS	\$18,000	\$18,000
11.	10" Gate Valve & Box	9	EA	\$1,500	\$13,500
12.	6" Gate Valve & Box	2	EA	\$1,000	\$2,000
13.	4" Gate Valve & Box	3	EA	\$650	\$1,950
14.	10" Gate Valve & Box w/ Taps	5	EA	\$2,000	\$10,000
15.	Air Release Valve & Box	2	EA	\$1,200	\$2,400
16.	Connection to Existing Mains (All Sizes)	8	EA	\$2,000	\$16,000
17.	Customer Service Re-Connection	29	EA	\$400	\$11,600
18.	Add'l 3/4" HDPE Tubing	200	LF	\$4	\$800
19.	Add'l 1" HDPE Tubing	100	LF	\$5	\$500
20.	#57 Crushed Stone	350	LF	\$10	\$3,500
21.	#9M Crushed Stone Bedding	350	TN	\$20	\$7,000
22.	Bituminous Paving Replacement	50	LF	\$35	\$1,750
23.	Concrete Paving Replacement	50	LF	\$50	\$2,500
24.	10" Check Valve & Vault	1	LS	\$15,000	\$15,000
25.	Videotaping	1	LS	\$1,500	\$1,500
26.	Cleanup	11,500	LF	\$1	\$11,500
27.	KY34 PS Impeller Upgrade	1	LS	\$5,000	\$5,000
				SUBTOTAL	\$374,250



Parksville Water District
 Water System Improvements Project
 Opinion of Probable Cost

Project No: 4151.00
 Engineer: CAS
 Date: 5/16/2013

Worldstown Spur Upgrade - Construction

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total</u>
1.	2" PVC Water Line	475	LF	\$4	\$1,900
2.	Tracer Wire & Warning Tape	475	LF	\$1	\$475
3.	4" Steel Casing by Open Cut	20	LF	\$50	\$1,000
4.	Connection to Existing System	1	EA	\$1,200	\$1,200
5.	Customer Service Same Side	3	EA	\$550	\$1,650
6.	Customer Service Opp. Side	4	EA	\$700	\$2,800
7.	Add'l 3/4" HDPE Service Tubing	20	LF	\$4	\$80
8.	Add'l 1" HDPE Service Tubing	20	LF	\$5	\$100
9.	2" Blowoff Assembly	1	EA	\$1,000	\$1,000
10.	#57 Crushed Stone	100	LF	\$10	\$1,000
11.	#9M Crushed Stone Bedding	10	TON	\$20	\$200
12.	Bituminous Paving Replacement	80	LF	\$35	\$2,800
13.	Cleanup	475	LF	\$2	\$950
14.	Videotaping	1	LS	\$350	\$350
<i>SUBTOTAL</i>					<i>\$15,505</i>

KY 37 Washout Replacement - Construction

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total</u>
1.	4" PVC Water Line	425	LF	\$5	\$2,125
2.	Tracer Wire & Warning Tape	425	EA	\$1	\$425
3.	Connection to Existing System	2	EA	\$1,200	\$2,400
4.	8" Steel Casing Pipe by Bore	50	LF	\$75	\$3,750
5.	4" Gate Valve & Box	2	EA	\$650	\$1,300
6.	#57 Crushed Stone	400	LF	\$10	\$4,000
7.	#9M Crushed Stone Bedding	40	TON	\$20	\$800
8.	Cleanup	425	LF	\$2	\$850
9.	Videotaping	1	LS	\$350	\$350
<i>SUBTOTAL</i>					<i>\$16,000</i>

SCADA System - Construction

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total</u>
1.	Central Location (Office)	1	LS	\$35,000	\$35,000
2.	Remote Sites - 4 PS, 4 Tank, KY 34 MM, Control Valve	10	EA	\$15,000	\$150,000
<i>SUBTOTAL</i>					<i>\$185,000</i>
TOTAL CONSTRUCTION					\$590,755
<i>USE</i>					<i>\$600,000</i>



Parksville Water District
Water System Improvements Project
Opinion of Probable Cost

Project No: 4151.00
Engineer: CAS
Date: 5/16/2013

PROJECT COST SUMMARY

Legal/Administrative	\$15,000
Engineering - Preliminary	\$12,000
Engineering - Design	\$40,000
Engineering - Ad/Bid	\$6,000
Engineering - Const Admin	\$8,750
Engineering - Const Closeout	\$3,000
Engineering - Observation	\$40,000
Engineering - Amendment No. 1	\$18,000
Hydraulic Study	\$30,000
RD Environmental	\$3,500
PSC	\$2,000
Interest During Construction	\$20,000
Land & Rights	\$1,000
Contingencies (10% +/-)	<u>\$50,000</u>
PROJECT COST SUBTOTAL	\$249,250
CONSTRUCTION COST SUBTOTAL	<u>\$600,000</u>
TOTAL PROJECT	\$849,250
USE	<u><u>\$850,000</u></u>

PROJECT FUNDING

RD Grant	\$217,000
RD Loan (38 yrs @ 2.75%)	<u>\$508,000</u>
	\$725,000
<i>Potential Cost Overrun</i>	\$125,000

PROJECT DEBT SERVICE

Assume Intermediate Interest Rate, 2.75% for 38 Years + 10% Coverage on \$508,000 Loan
Annual Debt Payments = \$23,861
1700 Customers = \$1.17 Per Month/Customer