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**Knott County Water and Sewer District
Final Engineering Report
for the
Carr Creek Lake Water Treatment Plant Project**

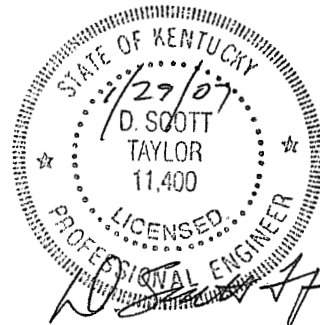
January 22, 2007

**Knott County Water and Sewer District
90 Justice Court
Hindman, Ky 41822**

prepared by

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**Final Engineering Report
Carr Creek Water Treatment Plant
Knott County Water and Sewer District**

January 22, 2007

The Knott County Water and Sewer District received partial funding for their Water Treatment Project from USDA Rural Development on June 29, 2006 and began design on the facilities. Based on countywide and Regional water service, the plant was sized for initial operation at 2 MGD and expandable in the future to 4 MGD.

The plant was designed based on criteria outlined by the District manager and included accelerated sedimentation by the Actiflo process followed by manufactured filter media by Macrolite utilizing pressure filters. The Department for Natural Resources and Environmental Protection Division of Water approved the concept and treatment components in writing before the District proceeded with final design.

During review of the Plans and Specifications by the DNREP-DOW another similar water treatment plant was completed in the State with similar design components. Since it was experiencing serious problems with the combination of Actiflo and Pressure Filters, the DOW denied the plans and required that the plant be redesigned with gravity filters in lieu of the pressure filters. The redesign was completed, reviewed by the DOW and approved for construction.

The project was bid on April 12, 2006 and all bids received were well over the project budget. Upon review of the cost items as prepared by the low three bidders, we identified the expensive Carr Creek Lake intake structure and the large amount of site earthwork as component to modify to reduce the cost of the facilities. Those components were redesigned and resubmitted to the Division of Water where the changes were approved for construction. (See the DNREP-DOW approval letter in the appendix.)

Since the project was so far over budget and the changes planned were not considered significant enough to bring the project into the budget, additional funds were sought. Commitments of an additional \$3,000,000 from County Coal Severance Funds and State 2020 Funds were obtained. The project was re-bid on December 13, 2006 and sufficient funds are now available to make the award.

The low bidder on the contract was Reynolds, Inc. of Orleans, Indiana in the amount of \$8,639,000. (See the bid tabulation in the appendix.) Reynolds is a very large well known general contractor with excellent references and capabilities. We have recommended award based on the low bid price and

qualifications of the low bidder. (See the recommendation of award letter in the appendix). The CDBG project administrator is preparing the paperwork for review by the various agencies involved in the funding and preparing for award.

The project was planned on the basis of a \$100,000 loan from RD and the balance in grants from RD, CDBG, KIA, EPA and others. The project cost increased dramatically over the course of the funding acquisition, facility design and the bidding process but those increases were matched with increases in grant funds therefore the loan amount is still the original \$100,000. The grants were made available to the District in order to keep the rates as low as possible in this very low income area. With no change in the loan amount in the project financing plan, the existing rates are proposed. (See the revised project budget showing the project costs elements and the listing of the funding sources and amounts in the appendix).

One of the identified cost components for the project is the water rights from the Corps of Engineers to withdrawal water from the Carr Creek facility. The Corps has prepared costs for withdrawals of 2 MGD up to 6 MGD for the future. The RD revised Letter of Conditions provides for \$1,116,839 budgeted as "Land and Rights" which included an allocation to purchase the plant site property and \$916,839 to be paid to the COE for withdrawal rights for 2 MGD. The \$916,839 included a lump sum of \$305,563 for the lake supply allocation plus an amortization of additional O&M annual expenses of \$55,700. In order to stay within the financing acquired to date, the proposed funding analysis contained herein shows the COE payment at \$305,563 and provides for 2 years O&M to allow for growth in customer base and operations before including the additional O&M in the District annual budget. The Knott County Water and Sewer District concurred in the adjustment along with all funding agency representatives present at the project financing planning meeting. The balance of the withdrawal fee fund is allocated to contingencies to provide for sufficient funds to proceed to construction.

The construction contract period is 550 days and based on an anticipated start date of March 1, 2007, the completion is scheduled to be August 2008. During the construction of the water treatment plant facilities, the District will also be constructing several water line extension projects to tie into the plant system to provide for service to much of Knott County and the surrounding areas that are in serious need of potable water.

APPENDIX

DNREP - Division of Water Approval

Bid Tabulation - Bid Date April 12, 2006

Bid Tabulation - Re-Bid Date December 13, 2006

Engineer's Recommendation of Award

Revised Project Budget

DNREP - Division of Water Approval



ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

Ernie Fletcher
Governor

Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601
www.kentucky.gov

LaJuana S. Wilcher
Secretary

October 4, 2006

Ms. Alice G. Ritchie, Chairperson
Knott County Water District
PO Box 884
Hindman, KY 41822

RE: Knott County Water District, PWS--44215
DW #0600062-04-002
Carr Creek Water Treatment Plant
Activity ID # APE20040001
Knott County

Dear Ms. Ritchie:

We have reviewed the Changes in Design for Re-bid for the above referenced project. We received stamped plans and specifications for the changes on October 4, 2006. The plans include revisions to the intake and sludge handling plus changes associated with moving the proposed WTP and clearwell. This is to advise that the revisions to the plans and specifications for the proposed Carr Creek Water Treatment Plant are APPROVED with respect to sanitary features of design as of this date with the following stipulations:

1. Provisions of our previous approvals dated September 19, 2005 and October 20, 2005 shall not be affected by this correspondence.
2. The potable water line feeding the proposed sludge press shall be equipped with a double check assembly or approved equivalent.
3. If sanitary features of the approved plans are to be changed during construction, the engineer shall submit the revision to the Division of Water for approval prior to implementation of the modification. Written approval from the Division of Water must be granted prior to on-site work dedicated to the adjustment.
4. When this project is completed, the owner shall submit a written certification to the Division of Water that the above referenced water facilities have been constructed and tested in accordance with the approved plans. Such certification shall be signed by a licensed professional engineer.
5. When this project is completed, the engineer shall submit as-built drawings to the Division of Water.

Unless construction of this project is begun within 1 year from the issuance date of this permit, the permit shall expire. If requested prior to the permit expiration, an official extension from the Division of Water may be granted. If this permit expires, plans and specifications may be resubmitted for a new comprehensive review.

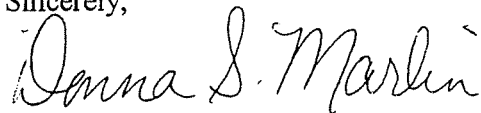
Once the new potable water treatment plant is completed, the following operating stipulations will apply until future construction, modification, or correspondence from the Division of Water changes the applicability of the stipulations. Further, if a stipulation is changed or deemed to be no longer applicable, unaffected stipulations shall not be voided.

1. The Carr Creek Water Treatment Plant will be designated as a Class IIIA water treatment plant.
2. A Class IIIA water treatment plant operator shall be in direct responsible charge of the water treatment system upon and following startup.

This approval has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this approval does not relieve the applicant from the responsibility of obtaining any other approvals, permits or licenses required by this Cabinet and other state, federal and local agencies.

If you have any questions regarding this correspondence, please contact Keith Metzker at 502/564-2225, extension 557.

Sincerely,



Donna Marlin, Branch Manager
Drinking Water Branch
Division of Water

DM:MR:KM

C: D. Scott Taylor, MSE of Kentucky, Inc.
David Holroyd, EPA Region IV
Knott County Health Department
Project Administration Section, RPPS Branch

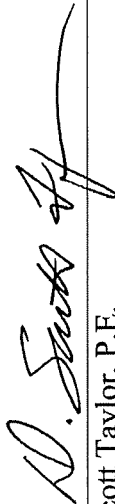
Bid Tabulation - Bid Date April 12, 2006

Certified Bid Tabulation
 Knott County Water and Sewer District
 Contract 1: Water Treatment Plant
 Bid Opening April 12, 2006

	Treatment Plant and Intake Items	Hall	W. Rogers	Smith
1	Intake structure and raw water pumps	\$1,451,000	\$1,294,439	\$2,100,000
2	Oxidation Tank, Foundation and Accessories	122,000	155,000	80,000
3	Clearwell Tank, Foundation and Accessories	326,000	335,000	400,000
4	Sludge Holding Tank and Sludge Pumps	346,000	405,208	700,000
5	Sludge Drying Beds and Loader	116,000	65,249	200,000
6	Detention Tank and Baffle Walls	87,000	150,496	500,000
7	Actiflo Equipment and Accessories	698,584	698,584	698,584
8	Actiflo System Installation and Construction	293,000	50,000	750,000
9	USFilter CenTROL Gravity Filters	692,000	387,000	750,000
10	Chemical Feed Day Tanks, Mixers & Feeders	336,000	395,000	100,000
11	Chlorination Equipment and Safety Facilities	59,000	90,000	100,000
12	High Service Pumps and Motors	65,000	51,000	75,000
13	Turbidity Monitoring Equipment	7,000	30,000	25,000
14	Instrumentation, Controls, Telemetry & Electrical	732,000	630,000	100,000
15	Distribution System Telemetry	0	0	0
16	Front Office Building and Furnishings	363,000	392,000	350,000
17	WTP Filter Building	1,358,000	1,772,024	1,000,000
18	Sitework Roads, Drainage, Excavation and Fill	1,610,416	1,459,000	1,000,000
19	All yardwork and piping	758,000	706,000	800,000
20	All other items for a complete WTP not specifically bid	65,000	500,000	46,416
	Total Base Bid	\$9,485,000	\$9,566,000	\$9,775,000

I hereby certify that this is an accurate tabulation of bids as received

MAYES, SUDDERTH & ETHEREDGE, INC.


 D. Scott Taylor, P.E.

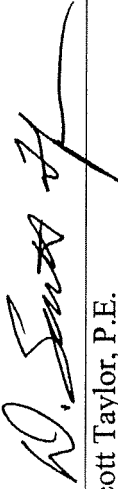
Bid Tabulation - Re-Bid Date December 13, 2006

Certified Bid Tabulation
 Knott County Water and Sewer District
 Contract 1: Water Treatment Plant
 Bid Opening December 13, 2006

	Treatment Plant and Intake Items	Reynolds	Hall
1	Intake facilities and raw water submersible turbines	\$350,000	\$392,000
2	Oxidation Tank, Foundation and Accessories	100,000	151,000
3	Clearwell Tank, Foundation and Accessories	325,000	422,000
4	Sludge Holding Tank and Sludge Pumps	525,000	434,000
5	Sludge Rotary Fan Press and Building	365,000	437,000
6	Detention Tank and Baffle Wall	150,000	662,000
7	Actiflo Equipment and Accessories	698,584	698,584
8	Actiflo Syste DESCRIPTI(CAMOUNT	155,000	241,000
9	USFilter CenTROL Gravity Filters	850,000	873,000
10	Chemical Feed Day Tanks, Mixers & Feeders	525,000	261,400
11	Chlorination Equipment and Safety Facilities	45,000	78,000
12	High Service Pumps and Motors	275,000	66,000
13	Turbidity Monitoring Equipment	25,000	12,000
14	Instrumentation, Controls, Telemetry & Electrical	675,000	510,000
15	Front Office Building and Furnishings	450,000	451,000
16	WTP Filter Building	500,000	1,265,000
17	Sitework Roads, Drainage, Excavation and Fill	1,100,000	1,440,000
18	All yardwork and piping	850,000	933,000
19	All other items for a complete WTP not specifically bid	675,416	59,016
	Total Base Bid	\$8,639,000	\$9,386,000

I hereby certify that this is an accurate tabulation of bids as received

MAYES, SUDDERTH & ETHEREDGE, INC.



D. Scott Taylor, P.E.

Engineer's Recommendation of Award

January 22, 2007

Alice Ritchie
Knott County Water and Sewer District
90 Justice Center Drive
Hindman, KY 41822

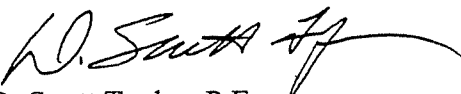
RE: Carr Creek Water Treatment Plant - Contract 1
Recommendation of Award
Project No. 8259-11

Based on the bids received, the available project funds, and the qualifications of the low bidder, we hereby recommend award of the Water Treatment Plant Contract 1 for \$8,639,000 to Reynolds, Inc. of Orleans, Indiana. See the attached bid tabulation of all bids received and the revised project budget and funding estimate for details.

Please advise if you have any questions regarding the award for this project.

Sincerely,

MSE of Kentucky and RM Johnson, Inc.


D. Scott Taylor, P.E
Project Engineer

cc: Doug Moore, RD London

Revised Project Budget

XXXIII. ESTIMATED PROJECT COST - WATER

	Distribution	Treatment	Total
Development Costs	\$0	\$8,639,000	\$8,639,000
Land and Rights	0	516,963	516,963
Legal Fees (Bond and Local Counsel)	0	38,000	38,000
Engineering Design, Inspection & Other	0	1,050,300	1,050,300
Interest Expense	0	60,000	60,000
Contingencies 5.39%	0	465,597	465,597
Administration Fees	0	50,000	50,000
Initial O&M Fund	0	100,000	100,000
Other	0	<u>0</u>	<u>0</u>
TOTAL	\$0	\$10,919,860	\$10,919,860

XXXIV. PROPOSED PROJECT FUNDING - WATER

	Distribution	Treatment	Total
Applicant - User Contribution Fees		\$0	0
Other - Applicant Contribution			0
RUS Loan		100,000	100,000
RUS Grant		3,419,860	3,419,860
ARC Grant (If applicable)		500,000	500,000
CDBG (If applicable)		2,000,000	2,000,000
Other (Specify) KIA		3,000,000	3,000,000
Other (Specify) EPA		<u>1,900,000</u>	<u>1,900,000</u>
TOTAL	\$0	\$10,919,860	\$10,919,860

Similarly, the Kentucky Association of Counties has created a leasing trust which is available to all county governments and special districts. County governments in Kentucky are prevented from incurring long-term mortgaged debt, thus necessitating the lease scenario. Entities with an acceptable bond rating are allowed to apply based on their own credit worthiness. Some entities may need some form of credit enhancement. Counties can borrow from the KACO fund and then lease the system to a district or municipality. The lease payment would be used to repay the loan.

Kentucky Rural Water Association

The Kentucky Rural Water Association (KRWA) has a pooled bond financing program very similar to the KACO program for its members.

Kentucky Economic Development Grants

The Kentucky Commerce Cabinet makes state Economic Development (ED) grants available to communities on a selected basis to assist in developing or improving infrastructure needed by new or expanding industry.

Comparisons of Loans

A comparison of financing costs from various sources available reveals the 4.5 percent RECD loan as having the lowest annual debt service, primarily because of its 40 year term. However, it also results in significantly more interest being paid if the loan is held for the 40 year term as shown in the following comparison for a \$1,000,000 loan:

RECD	@ 4.5% for 40 years with first 2 principal payments deferred	= \$ 55,402
KIA "C"	@ 7% for 25 years with issuance costs of 2.5% and funded debt service reserve of 10%	= \$ 96,751
KLC Lease	@ 7.1% for 30 years with issuance costs	= \$ 89,667
Conventional Bond	@ 7.5% for 25 years with issuance costs of 5% and funded debt service reserve	= \$ 104,513

The KACO and KRWA programs would have costs similar to the KLC financing. RECD does require rates sufficiently high to generate a debt coverage. However, this is not a cost of the financing. The scope of this project and magnitude of its financing with limited initial users will require primarily grant funds.

Cost Estimates -

The construction costs for water systems are based upon bid prices and other similar projects in the area. Cost estimates for lines are done on a system basis and translated to the average cost per foot of line, which includes all pipelines, fittings, valves, rock excavation, road and rail crossings, pavement replacement, and all other work necessary to construct an operating water system. Treatment plant costs are based on the size and type of components required for the plant. Equipment costs are obtained from suppliers. Tanks and pump stations are estimated based on size and a knowledge of costs per unit of capacity. Where applicable, the Davis-Bacon Act mandates federal wage rates be paid for all construction.

Costs other than for direct construction are encountered in implementing utility projects. Review of numerous funding applications has shown the following to be typical:

Construction Contingencies - An allowance for unforeseen conditions or project costs based on a percentage of the estimated construction cost is made for construction contingencies.

Land and Right-of-Way - An estimate based on other similar projects is made for land and right-of-way. It is assumed that easements, where required, will be available at nominal cost. All land for fixed facilities such as treatment plants, lagoons, etc., was assumed to be purchased as fee simple. CDBG regulations require the Federal Uniform Acquisition Act to be followed. This Act is complex and requires very exacting steps to be taken before property can be purchased.

Engineering - Engineering costs are based on the Farmers Home Administration fee schedule used by RECD and CDBG for the type of work in question.

Resident Inspection - Resident inspection is also based on the RECD fee schedule. RECD requires full time inspection followed by the Engineer's certification that work is in compliance with plans and specifications.

Legal and Administration - These items include administrative work directly associated with construction, bond attorney fees, legal counsel and other similar matters. Again, RECD has a fee schedule for local counsel and bond counsel.

Interest During Construction - This item is required to pay off the interest incurred on the construction loan prior to the final bond sale or availability of final financing.

Environmental - An environmental assessment and archaeological survey are normally required for Federally funded projects as part of the application process.

Planning - A preliminary engineering study and application assistance are usually paid for with project funds. The CDBG program has a specific planning requirement.

Administration - Some Federal funds (CDBG) require use of a project administrator to assure compliance with agency guidelines.

Audit - A close-out audit by an independent auditor is normally required.

O & M Manual/Start-Up Services - Treatment works normally require preparation of O&M Manuals and provision of consulting assistance and guidance when facilities begin operation.

Geotechnical - Structures normally require a subsurface investigation with recommendations for construction of foundations.

Initial O & M - New utilities who have no existing cash flow will include funds in the project to pay for a few months operation, including inventory and supplies until revenues are established.

There are many other possible project costs including permits, bonds, insurance, and others.

Table 7 shows a detailed project cost estimate for the 2.5 MGD water plant. The plant components were estimated individually and compared with similar projects. The resulting average cost per gallon for the facility was \$2.06 which compares favorably with water treatment plant work recently bid. See Table 7 for a breakdown of the plant components. The table also shows the items and their cost that will be required to upgrade the plant capacity to 5 MGD. The cost estimate for the raw water main is shown in Table 8.

The cost for the transmission and distribution facilities including lines, pump stations and tanks and their appurtenances is summarized in Table 9. The costs for each segment of the transmission system is estimated in Tables 10 thru 16. The cost estimate for the mains includes allowances for valves, fittings, special road and creek crossings, surface restorations, booster pump stations, storage tanks and their controls.

The total project cost estimate includes all of the above estimated construction costs plus all anticipated non-construction costs including Engineering, Inspection, Land and Rights-of-Way, Legal Fees, an allowance for contingencies and an initial operation and maintenance fund to allow for the start-up of the system prior to revenue generation.

Table 7
Regional Water Study
Water Treatment Plant Cost Estimate

Item Description	Initial 2 MGD Construction Cost	Additional 2 MGD Upgrade Cost	Additional 2 MGD Upgrade Cost
Sitework	\$605,000	\$312,500	\$625,000
Site Piping and Grading	488,000	375,000	375,000
Raw Water Pump Station	585,000	75,000	75,000
Chemical Mix	39,000	58,750	58,750
Flocculation/Clarification Units	491,000	730,000	730,000
Administration / Filtration Units	1,433,000	625,000	625,000
Clearwell System	225,000	333,750	333,750
High Service / Backwash Pump Station	393,000	100,000	100,000
Sludge Holding Lagoons	150,000	50,000	50,000
Sludge re-Cycle Pumps	151,000	50,000	50,000
Total Construction Cost	<u>\$4,560,000</u>	<u>\$2,710,000</u>	<u>\$3,022,500</u>
Estimated WTP Construction Cost	\$4,560,000	\$2,710,000	\$3,022,500

Table 8 - Raw Water Main
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Raw Water Line	
			Quantity	Cost
16" Water Line	\$25	L.F.	6,000	150,000.00
12" Water Line	\$18	L.F.	0	0.00
8" Water Line	\$14	L.F.	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	30	3,000.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	0	0.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00
16" Valve Assembly	\$1,100	Ea.	3	3,300.00
12" Valve Assembly	\$750	Ea.	0	0.00
8" Valve Assembly	\$500	Ea.	0	0.00
3/4" Air Release Valves	\$500	Ea.	3	1,500.00
6" Flush Hydrant	\$1,500	Ea.	1	1,500.00
Creek Crossing	\$50	L.F.	0	0.00
Crushed Stone Paving Repair	\$5	L.F.	240	1,200.00
Light Duty Paving Repair	\$25	S.Y.	60	1,500.00
Heavy Duty Paving Repair	\$40	S.Y.	40	1,600.00
Telemetry Controls	\$20,000	Ea.	1	20,000.00
Booster Pump Station	\$120,000	Ea.	0	0.00
1 MG Water Storage Tank	\$500,000	Ea.	0	0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	0	0.00
100,000 G Water Storage Tank	\$175,000	Ea.	0	0.00
Total				\$183,600.00

Table 9 - All Mains, Tanks & Pumps
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Total	
			Quantity	Cost
16" Water Line	\$25	L.F.	45,000	1,125,000.00
12" Water Line	\$18	L.F.	236,000	4,248,000.00
8" Water Line	\$14	L.F.	35,000	490,000.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	260	26,000.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	1,340	100,500.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	200	10,000.00
16" Valve Assembly	\$1,100	Ea.	26	28,600.00
12" Valve Assembly	\$750	Ea.	134	100,500.00
8" Valve Assembly	\$500	Ea.	20	10,000.00
3/4" Air Release Valves	\$500	Ea.	158	79,000.00
6" Flush Hydrant	\$1,500	Ea.	34	51,000.00
Creek Crossing	\$50	L.F.	29	1,450.00
Crushed Stone Paving Repair	\$5	L.F.	12,640	63,200.00
Light Duty Paving Repair	\$25	S.Y.	3,160	79,000.00
Heavy Duty Paving Repair	\$40	S.Y.	2,108	84,320.00
Telemetry Controls	\$20,000	Ea.	14	280,000.00
Booster Pump Station	\$120,000	Ea.	6	720,000.00
1 MG Water Storage Tank	\$500,000	Ea.	1	500,000.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	1	600,000.00
500,000 G Water Storage Tank	\$250,000	Ea.	4	1,000,000.00
100,000 G Water Storage Tank	\$175,000	Ea.	3	525,000.00
Total				\$10,121,570.00

Table 10 - Highway 1231
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Highway 1231	
			Quantity	Cost
16" Water Line	\$25	L.F.	31,000	775,000.00
12" Water Line	\$18	L.F.	0	0.00
8" Water Line	\$14	L.F.	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	180	18,000.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	0	0.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00
16" Valve Assembly	\$1,100	Ea.	18	19,800.00
12" Valve Assembly	\$750	Ea.	0	0.00
8" Valve Assembly	\$500	Ea.	0	0.00
3/4" Air Release Valves	\$500	Ea.	16	7,750.00
6" Flush Hydrant	\$1,500	Ea.	3	4,500.00
Creek Crossing	\$50	L.F.	0	0.00
Crushed Stone Paving Repair	\$5	L.F.	1,240	6,200.00
Light Duty Paving Repair	\$25	S.Y.	310	7,750.00
Heavy Duty Paving Repair	\$40	S.Y.	207	8,280.00
Telemetry Controls	\$20,000	Ea.	3	60,000.00
Booster Pump Station	\$120,000	Ea.	0	0.00
1 MG Water Storage Tank	\$500,000	Ea.	1	500,000.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	1	250,000.00
100,000 G Water Storage Tank	\$175,000	Ea.	0	0.00
Total				\$1,657,280.00

Table 11 - Hindman Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Hindman	
			Quantity	Cost
16" Water Line	\$25	L.F.	0	0.00
12" Water Line	\$18	L.F.	16,000	288,000.00
8" Water Line	\$14	L.F.	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	0	0.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	90	6,750.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00
16" Valve Assembly	\$1,100	Ea.	0	0.00
12" Valve Assembly	\$750	Ea.	9	6,750.00
8" Valve Assembly	\$500	Ea.	0	0.00
3/4" Air Release Valves	\$500	Ea.	8	4,000.00
6" Flush Hydrant	\$1,500	Ea.	2	3,000.00
Creek Crossing	\$50	L.F.	2	100.00
Crushed Stone Paving Repair	\$5	L.F.	640	3,200.00
Light Duty Paving Repair	\$25	S.Y.	160	4,000.00
Heavy Duty Paving Repair	\$40	S.Y.	107	4,280.00
Telemetry Controls	\$20,000	Ea.	1	20,000.00
Booster Pump Station	\$120,000	Ea.		0.00
1 MG Water Storage Tank	\$500,000	Ea.		0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.		0.00
500,000 G Water Storage Tank	\$250,000	Ea.		0.00
100,000 G Water Storage Tank	\$175,000	Ea.		0.00
Total				\$340,080.00

Table 12 - Prison/Industrial Park Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Prison/Ind Park	
			Quantity	Cost
16" Water Line	\$25	L.F.	0	0.00
12" Water Line	\$18	L.F.	40,000	720,000.00
8" Water Line	\$14	L.F.	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	0	0.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	230	17,250.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00
16" Valve Assembly	\$1,100	Ea.	0	0.00
12" Valve Assembly	\$750	Ea.	23	17,250.00
8" Valve Assembly	\$500	Ea.	0	0.00
3/4" Air Release Valves	\$500	Ea.	20	10,000.00
6" Flush Hydrant	\$1,500	Ea.	4	6,000.00
Creek Crossing	\$50	L.F.	4	200.00
Crushed Stone Paving Repair	\$5	L.F.	1,600	8,000.00
Light Duty Paving Repair	\$25	S.Y.	400	10,000.00
Heavy Duty Paving Repair	\$40	S.Y.	267	10,680.00
Telemetry Controls	\$20,000	Ea.	2	40,000.00
Booster Pump Station	\$120,000	Ea.	1	120,000.00
1 MG Water Storage Tank	\$500,000	Ea.		0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	1	600,000.00
500,000 G Water Storage Tank	\$250,000	Ea.		0.00
100,000 G Water Storage Tank	\$175,000	Ea.		0.00
Total				\$1,559,380.00

Table 13 - Pippa Passes Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Pippa Passes	
			Quantity	Cost
16" Water Line	\$25	L.F.	0	0.00
12" Water Line	\$18	L.F.	0	0.00
8" Water Line	\$14	L.F.	25,000	350,000.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	0	0.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	0	0.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	140	7,000.00
16" Valve Assembly	\$1,100	Ea.	0	0.00
12" Valve Assembly	\$750	Ea.	0	0.00
8" Valve Assembly	\$500	Ea.	14	7,000.00
3/4" Air Release Valves	\$500	Ea.	13	6,250.00
6" Flush Hydrant	\$1,500	Ea.	3	4,500.00
Creek Crossing	\$50	L.F.	3	150.00
Crushed Stone Paving Repair	\$5	L.F.	1,000	5,000.00
Light Duty Paving Repair	\$25	S.Y.	250	6,250.00
Heavy Duty Paving Repair	\$40	S.Y.	167	6,680.00
Telemetry Controls	\$20,000	Ea.	2	40,000.00
Booster Pump Station	\$120,000	Ea.	1	120,000.00
1 MG Water Storage Tank	\$500,000	Ea.	0	0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	0	0.00
100,000 G Water Storage Tank	\$175,000	Ea.	1	175,000.00
Total				\$727,830.00

Table 14 - Vicco Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Vicco	
			Quantity	Cost
16" Water Line	\$25	L.F.	0	0.00
12" Water Line	\$18	L.F.	16,000	288,000.00
8" Water Line	\$14	L.F.	10,000	140,000.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	0	0.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	90	6,750.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	60	3,000.00
16" Valve Assembly	\$1,100	Ea.	0	0.00
12" Valve Assembly	\$750	Ea.	9	6,750.00
8" Valve Assembly	\$500	Ea.	6	3,000.00
3/4" Air Release Valves	\$500	Ea.	13	6,500.00
6" Flush Hydrant	\$1,500	Ea.	3	4,500.00
Creek Crossing	\$50	L.F.	3	150.00
Crushed Stone Paving Repair	\$5	L.F.	1,040	5,200.00
Light Duty Paving Repair	\$25	S.Y.	260	6,500.00
Heavy Duty Paving Repair	\$40	S.Y.	173	6,920.00
Telemetry Controls	\$20,000	Ea.	2	40,000.00
Booster Pump Station	\$120,000	Ea.	1	120,000.00
1 MG Water Storage Tank	\$500,000	Ea.	0	0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	0	0.00
100,000 G Water Storage Tank	\$175,000	Ea.	1	175,000.00
Total				\$812,270.00

Table 15 - Beaver Elkhorn Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	SR 582		SR 7		Floyd Co Connector Quantity	Floyd Co Connector Cost
			Quantity	Cost	Quantity	Cost		
16" Water Line	\$25	L.F.	0	0.00	0	0.00	0	0.00
12" Water Line	\$18	L.F.	46,000	828,000.00	59,000	1,062,000.00	25,000	450,000.00
8" Water Line	\$14	L.F.	0	0.00	0	0.00	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	0	0.00	0	0.00	0	0.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	260	19,500.00	340	25,500.00	0	0.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00	0	0.00	140	10,500.00
16" Valve Assembly	\$1,100	Ea.	0	0.00	0	0.00	0	0.00
12" Valve Assembly	\$750	Ea.	26	19,500.00	34	25,500.00	0	0.00
8" Valve Assembly	\$500	Ea.	0	0.00	0	0.00	14	10,500.00
3/4" Air Release Valves	\$500	Ea.	23	11,500.00	30	14,750.00	0	0.00
6" Flush Hydrant	\$1,500	Ea.	5	7,500.00	6	9,000.00	13	6,250.00
Creek Crossing	\$50	L.F.	5	250.00	6	300.00	3	4,500.00
Crushed Stone Paving Repair	\$5	L.F.	1,840	9,200.00	2,360	11,800.00	3	150.00
Light Duty Paving Repair	\$25	S.Y.	460	11,500.00	590	14,750.00	1,000	5,000.00
Heavy Duty Paving Repair	\$40	S.Y.	307	12,280.00	393	15,720.00	250	6,250.00
Telemetry Controls	\$20,000	Ea.	3	60,000.00	0	0.00	167	6,680.00
Booster Pump Station	\$120,000	Ea.	1	120,000.00	0	0.00	0	0.00
1 MG Water Storage Tank	\$500,000	Ea.	0	0.00	0	0.00	1	120,000.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00	0	0.00	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	0	0.00	0	0.00	0	0.00
100,000 G Water Storage Tank	\$175,000	Ea.	1	250,000.00	0	0.00	1	250,000.00
Total			1	175,000.00	0	0.00	0	0.00
				\$1,524,230.00		\$1,179,320.00		\$869,830.00

Table 16 - Letcher County Water District Connector
Transmission and Distribution Mains
Construction Cost Estimate

Description	Unit Price	Units	Letcher Connector	
			Quantity	Cost
16" Water Line	\$25	L.F.	8,000	200,000.00
12" Water Line	\$18	L.F.	34,000	612,000.00
8" Water Line	\$14	L.F.	0	0.00
Steel Casing Pipe for 16" Waterline bored	\$100	L.F.	50	5,000.00
Steel Casing Pipe for 12" Waterline bored	\$75	L.F.	190	14,250.00
Steel Casing Pipe for 8" Waterline bored	\$50	L.F.	0	0.00
16" Valve Assembly	\$1,100	Ea.	5	5,500.00
12" Valve Assembly	\$750	Ea.	19	14,250.00
8" Valve Assembly	\$500	Ea.	0	0.00
3/4" Air Release Valves	\$500	Ea.	21	10,500.00
6" Flush Hydrant	\$1,500	Ea.	4	6,000.00
Creek Crossing	\$50	L.F.	3	150.00
Crushed Stone Paving Repair	\$5	L.F.	1,680	8,400.00
Light Duty Paving Repair	\$25	S.Y.	420	10,500.00
Heavy Duty Paving Repair	\$40	S.Y.	280	11,200.00
Telemetry Controls	\$20,000	Ea.	0	0.00
Booster Pump Station	\$120,000	Ea.	1	120,000.00
1 MG Water Storage Tank	\$500,000	Ea.	0	0.00
500,000 G Elevated Storage Tank	\$600,000	Ea.	0	0.00
500,000 G Water Storage Tank	\$250,000	Ea.	1	250,000.00
100,000 G Water Storage Tank	\$175,000	Ea.	0	0.00
Total				\$1,267,750.00

A component also included in the total project cost is an allocation of storage from Carr Creek Lake. The Corps of Engineers studied withdrawal rates and their effects on the various defined pools of the reservoir in their January, 1997 report. In that report, they stated:

If, after review of information, contained in this report, a non-Federal sponsor requests water supply storage space in Carr Creek Lake, the future action will depend on the amount of space requested. A relatively small amount of storage space that would not significantly impact authorized project purposes could be reallocated to water supply purposes with minimum effort of preparing and executing a contract for the purchase. Any desired storage that would impact authorized purposes would require a report providing detailed information on costs and impacts to the authorized purposes. This magnitude of reallocation of storage space would require Congressional approval.

Section 322 of the Water Resources Development Act (WRDA) of 1990 made provision for the reduced price of water supply storage for low income communities that meet certain qualifications. This provision is discretionary in that the Assistant Secretary of the Army for Civil Works may, but is not required, to offer the lower price. The price of water under Section 322 is the greater of the benefits foregone or an updated price for the storage required. The price of \$100 per acre foot updated by the consumer price index is \$119 for FY97. A low income community is defined as having a population of less than 20,000 and the per capita income of its county must be less than that of two thirds of the counties in the United States. The maximum amount of water supply storage which may be provided to a community under this section may not exceed an amount sufficient to yield 2 MGD. This provision would reduce the cost for 2 MGD of storage in Carr Creek Lake from approximately \$8 million to approximately \$220,000.

The study outlined the cost of the allocation of the storage and the annual operation and maintenance for a series of withdrawal rates from 0.5 MGD to 6.5 MGD. Their summary table is reproduced in our Table 17 and the information is graphed to help analyze the flow and cost relationship. The cost for various withdrawal rates are estimated in Table 15 based upon the linear regression calculation of the data. The capital cost of a 5 MGD withdrawal would be \$513,400 and the annual O & M would be approximately \$109,000. The capital cost of securing an allocation of 2 MGD equal to the proposed Phase I water treatment plant capacity would be approximately \$214,200 and the annual O & M would be \$45,500. The participating suppliers could access 2 MGD each under Section 322 of the Water Resources Development Act, but the 6 MGD allocation would cost over \$614,000 initially and \$130,000 per year for operation and maintenance and should be limited to 5.5 to 6 MGD. This analysis assumes an allocation of 2 MGD to be able to meet the capacity of the plant.

Table 17
Carr Creek Lake
Withdrawal Rates and Costs
(Corps of Engineers Table 27)

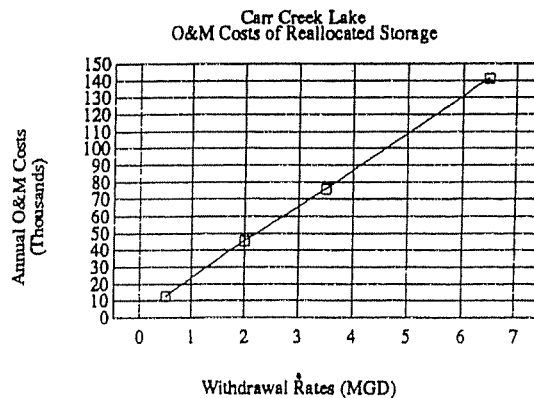
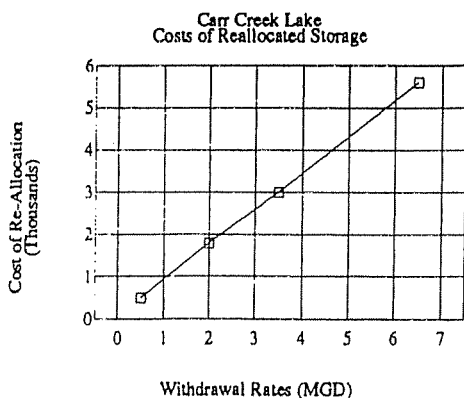
Withdrawal MGD	Storage Ac-ft	Storage Cost Allocation	Annual O&M
0.5	499	\$2,125,000	\$12,600
2	1800	\$7,670,000	\$45,500
3.5	3000	\$12,780,000	\$75,800
6.5	5600	\$23,840,000	\$141,000

Revised Calculations with Section 322 Allocations

Withdrawal MGD	Storage Ac-ft	Storage Cost Section322	Annual O&M
0.5	499	\$59,381	\$12,600
2	1800	\$214,200	\$45,500
3.5	3000	\$357,000	\$75,800
6.5	5600	\$666,400	\$141,000

Estimated Costs Based upon Linear Regression Analysis

Withdrawal MGD	Storage Ac-ft	Storage Cost Section322	Annual O&M
0.5	499	\$59,429	\$12,720
1	923	109,870	23,388
1.5	1,347	160,311	34,055
2	1,771	210,752	44,723
2.5	2,195	261,194	55,390
3	2,619	311,635	66,058
3.5	3,043	362,076	76,726
4	3,467	412,517	87,393
4.5	3,890	462,959	98,061
5	4,314	513,400	108,729
5.5	4,738	563,841	119,396
6	5,162	614,283	130,064



The systems operation and maintenance expenses are estimated in Table 18. The total project cost for all transmission mains and phase treatment plant construction is estimated in Table 19. The water treatment plant and intake may be operated by the Water Authority formed by the interested water suppliers but they are not allowed to sell water directly to retail customers. See Appendix A Section 74.510. Therefore, one of the entities or a new entity will need to operate the transmission main to be able to offer service to individual customers along the transmission routes. Hindman who already serves well into Knott County or the Caney Creek Water District would be the likely candidates for the distribution supplier.

The average cost of water is estimated in Table 18 based upon the operation and maintenance costs previously established and the initial water demands as shown in the table. The treatment cost is just over \$1/1,000 gallons initially and with future growth and expansion Table 19 shows that the treatment cost falls below \$1/1,000 gallons after expansion. The cost of the transmission main operation and debt service is shown in Table 19. The final form of rates and charges will depend upon the authority decision on operation and maintenance of the transmission mains and the sales contract format.

Additional scenarios for phasing the construction of the distribution main shown in Tables 20 and 21 show the effect of the lower loan and the corresponding reduced initial water sales on the cost of service. Of course, additional grant money would offset the high cost of some of the transmission mains and allow the construction of all the transmission system initially.

Table 18
Regional Water Supply Study
Operation and Maintenance Cost Estimate

WTP O&M Cost Estimate

Initial WTP Usage		1,387,618 GPD
Estimated O&M per /1000 gallons		\$0.80
Daily O&M Cost		\$1,110.09 /day
Annual WTP O&M Cost Estimate		\$405,184
Carr Creek Lake O&M Charge		\$55,390
Water Source & WTP O&M Cost		\$460,575

Transmission / Distribution

Booster Pumping

Flow Pumped:	Cities / Knott County	1,187,618 GPD
	Prison/Ind Park	200,000 GPD
		1,387,618 GPD
Pumping Cost / 1000 gallons		\$0.06
Daily Pumping Cost		\$83.26
Annual Pumping Cost Estimate		\$30,389

General Operation & Maintenance

Length of Mains		26.14 miles
Annual O&M per mile		\$2,300
Annual Distribution O&M		\$60,114

Major Replacements and Maintenance

Tanks	\$20,000
Pumps	4,000
	\$24,000

Administrative & General

\$30,000
\$144,502

Total O&M Cost		\$605,077 /yr
Gallons Sold	1,387,618	365
Average Cost of Water per 1000 Gallons		\$1.19

Expansion O&M Costs

Total Usage		4 MGD
Initial Usage		1.387618 MGD
Additional Usage		2.612382 MGD
Estimated O&M per /1000 gallons		\$0.65
Daily O&M Cost		1698.048 /day
Additional WTP O&M Costs		\$619,788 /yr
Initial Total O&M		\$605,077 /yr
Additional WTP O&M Costs		619,788 /yr
		\$1,224,865 /yr
Gallons Sold	4	365
Average Cost of Water per 1000 Gallons		\$0.84

Table 19
Regional Water Supply
Water Treatment Plant and Transmission Mains
Project Cost & Financing Estimate

Facilities Cost Estimate	Phase I 2 MGD	Phase II 2 MGD	Phase III 2 MGD
Water Treatment Plant	\$4,560,000	\$2,710,000	\$3,022,500
Raw Water Line & Intake Facilities	\$663,600		
SR 1231 Trunk Line	\$1,657,280		
Hindman Connector	\$0		
Prison/Ind Park Connector	\$1,559,380		
Pippa Passes Connector	\$727,830		
Vicco Connector	\$812,270		
Beaver Elkhorn Connection	\$3,573,380		
Letcher County Connector	\$1,267,750		
	\$14,821,490	\$2,710,000	\$3,022,500
Carr Creek Lake Allocation			
Water Demand (MGD)	2	2	2
Allocated Storage Requirement	1,771	1,696	1,696
Unit Cost per Section 322	\$119	\$119	\$119
Cost of Allocation	\$210,752	\$201,765	\$201,765
Project Cost Estimate			
Construction Cost Estimate	\$15,032,242	\$2,911,865	\$3,224,265
Contingencies 20%	3,006,448	582,353	644,853
Engineering Design	879,400	170,300	188,600
Inspection	356,200	69,000	76,400
Additional Services	50,000	50,000	50,000
Land & Right-of-Way	200,000	50,000	50,000
Legal & Administrative	25,000	25,000	25,000
Initial Operation & Maintenance	100,000	100,000	100,000
Other	0	0	0
Total Project Cost Estimate	\$19,649,291	\$3,958,418	\$4,359,118
Cumulative Project Cost Estimate	\$19,649,291	\$23,607,709	\$27,966,827

Table 19 Continued
**Water Treatment Plant and Transmission Mains
 Project Cost & Financing Estimate**

	Phase I		
Project Funding Estimate	2 MGD		
CDGB Grant	\$2,000,000		
RD Grant	1,000,000		
ARC Grant	750,000		
EDA Grant	2,000,000		
AML Grant	1,000,000		
Ky Dept of Justice Grant	2,600,000		
Other (State, Coal Severance)	0		
	\$9,350,000		
Estimate of Debt Service			
Loan Required	\$10,299,291	\$10,299,291	\$10,299,291
Lending Agency	Revolving Loan	RD Loan	Bond Sale
Interest Rate	2%	5%	4%
Loan Period	25	38	30
Amortization factor	0.0512204	0.0592842	0.0578301
Annual Principal & Interest	\$527,534	\$610,586	\$595,609
Water Sales			
Prison/Ind Park	200,000 GPD		
Hindman	150,000 GPD		
Pippa Passes	100,000 GPD		
Knott County 1,174 new users	193,000 GPD		
Vicco	200,000 GPD		
Beaver Elkhorn Water District	264,957 GPD		
Letcher County Water District	279,661 GPD		
Total Sales	1,387,617 GPD		
Cost of Water Service			
Annual Water Sales	506,480,362 G/yr		
O&M Cost per 1000 gallons	\$0.84		
Annual O&M	\$424,911		
Annual Debt Service	\$595,609		
Coverage & Depreciation 50	\$205,986		
Revenue Requirement	\$1,226,506		
Cost per 1000 gallons Sold		\$2.42 /1000 Gallons	

Table 20
Regional Water Supply
Water Treatment Plant and Transmission Mains
Construction Cost Estimate

Facilities Cost Estimate	Phase I 2 MGD	Phase II 2 MGD	Phase II 2 MGD
Water Treatment Plant	\$4,560,000	\$2,710,000	\$3,022,500
Raw Water Line & Intake Facilities	\$683,600		
SR 1231 Trunk Line	\$1,657,280		
Hindman Connector	\$0		
Prison/Ind Park Connector	\$1,559,380		
Pippa Passes Connector	\$727,830		
Vicco Connector	\$812,270		
Beaver Elkhorn / Floyd Connector		\$3,573,380	
Letcher Co WD Connector			\$1,267,750
	\$10,000,360	\$6,283,380	\$4,290,250
 <u>Carr Creek Lake Allocation</u>			
Water Demand (MGD)	2	2	2
Allocated Storage Requirement	1,771	1,696	1,696
Unit Cost per Section 322	\$119	\$119	\$119
Cost of Allocation	\$210,752	\$201,765	\$201,765
 <u>Project Cost Estimate</u>			
Construction Cost Estimate	\$10,211,112	\$6,485,145	\$4,492,015
Contingencies 20%	2,042,222	1,297,029	898,403
Engineering Design	597,400	379,400	262,800
Inspection	259,800	165,000	114,300
Additional Services	50,000	50,000	50,000
Land & Right-of-Way	200,000	50,000	50,000
Legal & Administrative	25,000	25,000	25,000
Initial Operation & Maintenance	100,000	100,000	100,000
Total Project Cost Estimate	\$13,485,535	\$8,551,574	\$5,992,518
Cumulative Project Cost Estimate	\$13,485,535	\$22,037,109	\$28,029,627

Table 20 Continued
 Water Treatment Plant and Transmission Mains
 Project Financing Estimate

Project Funding Estimate	Phase I 2 MGD
CDBG Grant	\$2,000,000
RD Grant	1,000,000
ARC Grant	750,000
EDA Grant	2,000,000
AML Grant	1,000,000
Ky Dept of Justice Grant	2,600,000
Other (State, Coal Severance)	0
	\$9,350,000

Estimate of Debt Service

	\$4,135,535	\$4,135,535	\$4,135,535
Loan Required	\$4,135,535	\$4,135,535	\$4,135,535
Lending Agency	Revolving Loan	RD Loan	Bond Sale
Interest Rate	2%	5%	4%
Loan Period	25	38	30
Amortization factor	0.0512204	0.0592842	0.0578300
Annual Principal & Interest	\$211,824	\$245,172	\$239,158

Water Sales

Prison / Ind Park		200,000 GPD
Hindman		150,000 GPD
Pippa Passes		100,000 GPD
Knott County	523 new users	86,000 GPD
Vicco		200,000 GPD
Total Sales		736,000 GPD

Cost of Water Service

Annual Water Sales		268,640,000 G/yr
O&M Cost per 1000 gallons		\$0.84
Annual O&M		\$225,375
Annual Debt Service		\$239,158
Coverage & Depreciation	50	\$82,711
Revenue Requirement		\$547,244

Cost per 1000 Gallons Sold \$2.04 /1000 Gallons

Table 21
Regional Water Supply
Water Treatment Plant and Transmission Mains
Project Cost & Financing Estimate

Facilities Cost Estimate	Phase I 2 MGD	Phase II 2 MGD	Phase III 2 MGD
Water Treatment Plant	\$4,560,000	\$2,710,000	\$3,022,500
Raw Water Line & Intake Facilities	\$663,600		
SR 1231 Trunk Line	\$1,657,280		
Hindman Connector	\$0		
Prison/Ind Park Connector	\$1,559,380		
Pippa Passes Connector		\$727,830	
Vicco Connector		\$812,270	
Beaver Elkhorn Connection			\$3,573,380
Letcher County Connector			\$1,267,750
	\$8,440,260	\$4,250,100	\$7,863,630

Carr Creek Lake Allocation

Water Demand (MGD)	2	2	2
Allocated Storage Requirement	1,771	1,696	1,696
Unit Cost per Section 322	\$119	\$119	\$119
Cost of Allocation	\$210,752	\$201,765	\$201,765

Project Cost Estimate

Construction Cost Estimate	\$8,651,012	\$4,451,865	\$8,065,395
Contingencies 20%	1,730,202	890,373	1,613,079
Engineering Design	512,100	263,600	477,500
Inspection	234,700	120,800	218,900
Additional Services	50,000	50,000	50,000
Land & Right-of-Way	200,000	50,000	50,000
Legal & Administrative	25,000	25,000	25,000
Initial Operation & Maintenance	100,000	100,000	100,000
Total Project Cost Estimate	\$11,503,014	\$5,951,638	\$10,599,874
Cumulative Project Cost Estimate	\$11,503,014	\$17,454,652	\$28,054,526
	1.3296726	1.3539003	1.3516505

Table 21 Continued
 Water Treatment Plant and Transmission Mains
 Project Financing Estimate

Project Funding Estimate	Phase I 2 MGD
CDBG Grant	\$2,000,000
RD Grant	1,000,000
ARC Grant	750,000
EDA Grant	2,000,000
AML Grant	1,000,000
Ky Dept of Justice Grant	2,600,000
Other (State, Coal Severance)	0
	\$9,350,000

Estimate of Debt Service

	\$2,153,015	\$2,153,015	\$2,153,015
Loan Required	Revolving Loan	RD Loan	Bond Sale
Lending Agency	2%	5%	4%
Interest Rate	25	38	30
Loan Period	0.0512204	0.0592842	0.0578300
Amortization factor	\$110,278	\$127,640	\$124,509
Annual Principal & Interest			

Water Sales

Prison / Ind Park	200,000 GPD
Hindman	150,000 GPD
Pippa Passes	0 GPD
Knott County 330 new users	54,000 GPD
Vicco	0 GPD
Total Sales	404,000 GPD

Cost of Water Service

Annual Water Sales	147,460,000 G/yr
O&M Cost per 1000 gallons	\$0.84
Annual O&M	\$123,711
Annual Debt Service	\$124,509
Coverage & Depreciation 50	\$43,060
Revenue Requirement	\$291,281
 Cost per 1000 Gallons Sold	 \$1.98 /1000 Gallons

RECOMMENDATIONS AND CONCLUSIONS

The area surrounding Carr Creek Lake is in need of water to supplement or replace the existing water supplies dependent upon deteriorating groundwater and small surface water sources. The development of the lake as a source for service is feasible depending upon the sources and types of monies sought and committed.

The parties interested in joint operation of the source should embark in organizing an Authority under KRS 74.400 to apply for funds.

The Knott County Fiscal Court and the City of Hindman should work together with the Authority and determine the nature of service along the transmission mains where the Authority cannot act as a utility.

Representatives of the counties and communities of the planning area should meet with local, state and federal officials to discuss the project and obtain advice to help formulate a financing plan and implement the project. The phasing of the water treatment plant and transmission main can allow for smaller total project costs which may allow for less loan per gallon sold depending upon the grants available. The final form of the project components may be determined in part by the terms of the financing package.

74.420 Definitions for KRS 74.420 to 74.520.

As used in KRS 74.420 to 74.520, unless the context requires otherwise:

- (1) "Sources of supply of water" means and includes any or all of the following: wells, impounding reservoirs, standpipes, storage tanks, pumps, machinery, purification plants, softening apparatus, trunk mains, and all other appurtenances useful in connection with developing and furnishing a supply of water under pressure into the water distribution systems of the cities or water districts which are represented by a commission created pursuant to the provisions of KRS 74.420 to 74.520.
- (2) "Water association" means a nonprofit corporation formed for the purpose of furnishing water services to the general public pursuant to KRS Chapter 273.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 1, effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207, sec. 1, effective June 16, 1960.

74.430 Authority for joint operation of water sources.

In the interest of the public health and for the purpose of providing an adequate supply of water to cities, water associations, and water districts, any two (2) or more cities, or any two (2) or more water districts organized under this chapter, or any combination of cities, water districts, and water associations may jointly acquire, either by purchase or construction, sources of supply of water and may operate jointly the sources of supply of water and improve and extend them in the manner provided in KRS 74.420 to 74.520. The governing body of any city, water association, or water district desiring to avail themselves of the provisions of KRS 74.420 to 74.520 shall adopt a resolution or ordinance determining and electing to acquire and operate jointly sources of supply of water.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 2, effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207, sec. 2, effective June 16, 1960.

74.440 Procedure for creation of water commission.

- (1) Upon the adoption of an ordinance or resolution by the governing body of each city, water association, or water district, a certified copy of it shall be filed with the county judge/executive of the county in which the cities, water associations, or water districts proposing the creation of the commission having the greatest aggregate population are situated; and upon the filing, the county judge/executive shall by appropriate order set a date for a public hearing on the creation of the commission and shall give reasonable notice of the public hearing, which notice may be given in the manner as provided by KRS Chapter 424. Any customer of the water systems or resident of the cities proposing the creation of the commission may file objections; and at the public hearing if the county judge/executive finds that the establishment of the commission is reasonably necessary or advantageous for the public health, convenience, and comfort of the customers of all the water systems which proposed the creation of the commission, he shall make an order establishing the commission and designating it by name which name shall include the words "water commission."
- (2) If the county judge/executive does not find that the creation of a commission is reasonably necessary or advantageous, he shall make an appropriate order in this regard. Any party in interest may appeal the order to the Circuit Court or the cities, water associations, and water districts may revise and readopt the ordinances or resolutions.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 3, effective July 15, 1996. -- Amended 1978 Ky. Acts ch. 384, sec. 192, effective June 17, 1978. -- Created 1960 Ky. Acts ch. 207, sec. 3, effective June 16, 1960.

74.450 Membership of water commission -- Term -- Compensation -- Removal -- Status.

- (1) After the county judge/executive has made an order creating a water commission, the presiding officer of each of the cities, water associations, or water districts which proposed the creation of the commission with the approval of its governing body shall appoint one (1) commissioner. If the number of commissioners so appointed by the presiding officers of the cities, water associations, or water districts shall equal or exceed five (5), no further commissioners shall be appointed and the commissioners shall be and constitute the water commission.
- (2) If the number of commissioners appointed by the presiding officers of the cities, water associations, or water districts shall be less than five (5), the county judge/executive who entered the order creating the commission shall appoint additional commissioners to the commission as necessary to make the number of commissioners equal five (5). The commissioners shall constitute the commission, which shall be a public corporation and a public body corporate and politic with the powers and duties specified in KRS 74.420 to 74.520. The commission may in its corporate name contract and be contracted with, sue and be sued, adopt and alter at its pleasure a corporate seal, and purchase, own, hold, and dispose of all real and personal property necessary for carrying out its corporate purpose under KRS 74.420 to 74.520.
- (3) The commissioners originally appointed shall meet and select by lot their respective terms of office so that approximately one-third (1/3) of the commissioners shall serve for a term of two (2) years, a like number for a term of three (3) years and the remaining commissioner or commissioners for a term of four (4) years. The terms shall be deemed to commence from the first day of the month during which the order of the county judge/executive creating the commission was entered.
- (4) Upon the expiration of the term of office of each of the commissioners, a successor shall be appointed to succeed him for a term of four (4) years and the appointment shall be made in the same manner as the original appointment.
- (5) Each commissioner shall serve until his successor has been appointed and has been qualified. Each commissioner shall be a resident of the service area of the water systems which are represented by the commission. A commissioner shall be eligible for reappointment upon the expiration of his term. A vacancy shall be filled for the balance of the unexpired term in the same manner as that prescribed for the appointment of the person who has ceased to hold office. Each commissioner shall receive the same compensation, which shall not be more than five hundred dollars (\$500) per year, to be fixed by the commission and to be paid out of commission funds. Each commissioner shall furnish a bond for faithful performance of his official duties. This bond shall not be less than five thousand dollars (\$5,000); the amount shall be fixed by the commission; and its cost shall be paid by the commission.
- (6) Each commissioner may be removed by the official by whom he was appointed, for cause, after hearing by the appointing official and after at least ten (10) days' notice in writing has been given to the commissioner, which notice shall embrace the charges preferred against him. At the hearing he may be represented by counsel. The

finding of the appointing official shall be final and removal results in vacancy in the office.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 4, effective July 15, 1996. -- Amended 1978 Ky. Acts ch. 384, sec. 193, effective June 17, 1978. -- Created 1960 Ky. Acts ch. 207, sec. 4, effective June 16, 1960.

74.455 Removal of district water commissioner -- Causes.

- (1) From and after the creation and establishment of a water district and the appointment of water commissioners to manage the affairs of the district, and following the acquisition or construction by any duly created and established water district of a public water system, and the consequent establishment of regulatory jurisdiction over such water district by the Public Service Commission of Kentucky, the Public Service Commission may remove any water commissioner from his office for good cause, including, inter alia, incompetency, neglect of duty, gross immorality, or nonfeasance, misfeasance, or malfeasance in office, including without limiting the generality of the foregoing, failure to comply with rules, regulations, and orders issued by the Public Service Commission.
- (2) No such order of removal with respect to any water commissioner shall be entered by the Public Service Commission until a public hearing on the merits with reference to such matter has been held by the commission, at which hearing the water commissioner proposed to be removed from office shall be afforded the opportunity to appear, either pro se, or by counsel and file briefs, memoranda and motions, cross-examine witnesses, examine exhibits, and present evidence, both orally and in writing. All such orders of removal entered by the Public Service Commission shall be final and shall not be subject to appeal. Any water commissioner may waive such public hearing, in which case an order on removal may be forthwith entered by the commission.
- (3) Using procedures of this section the Public Service Commission may also request the removal of directors, trustees or other governing persons of water associations in like manner.

History: Created 1972 Ky. Acts ch. 310, sec. 3.

74.460 Organization of commission -- Powers and duties -- Authority to acquire water supply -- Obligations.

The commission shall organize by appointing a chairman from its own members and a secretary and a treasurer, who need not be commissioners. The secretary shall keep a record of all proceedings of the commission which shall be available for inspection as other public records. The treasurer shall be the lawful custodian of all funds of the commission and shall pay same out on orders authorized or approved by the commission. The secretary and treasurer shall perform other duties appertaining to the affairs of the commission and shall receive the salaries prescribed by the commission, and either or both may be required to furnish bonds in sums to be fixed by the commission for the use and benefit of the commission. The commission shall adopt its own rules of procedure and provide for its meetings. The commission shall have full and complete supervision, management, and control of the sources of supply of water as provided in the ordinances or resolutions for acquiring and operating them, and in their maintenance, operation, and extension. The commission may contract with cities, water associations, or water districts which are represented by the commission for furnishing a supply of water to the parties for a period not exceeding fifty (50) years and the governing bodies of the cities, water associations, or water districts may enter into the contracts with the commission. For the purpose of acquiring all or any part of its sources of supply of water, the commission may purchase from cities, water associations, or water districts which are represented by the commission for mutually agreed terms without regard to actual value any sources of supply of water separate and apart from the water distribution systems of the parties; and the cities, water associations, or water districts may convey the sources of supply of water to the commission without any election or voter approval notwithstanding any provision of any other law to the contrary. If any city, water association, or water district has outstanding any obligations which by their terms are in any manner payable from the revenues of their waterworks distribution system, the proceeds received from any conveyance shall be sufficient to retire all of the outstanding obligations, including all interest accrued and to accrue thereon to the date of retirement thereof; and the proceeds when received shall be set aside in a special fund and used for that purpose. The commission may appoint or contract for the services of officers, agents, and employees, including engineers, attorneys, accountants, fiscal agents, and other professional persons, prescribe their duties, and fix their compensation.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 5, effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207, sec. 5, effective June 16, 1960.

74.470 Authority to issue revenue bonds.

For the purpose of acquiring, either by purchase or construction, sources of supply of water or for making improvements and extensions to sources of supply of water, a commission may issue revenue bonds payable solely from the revenues to be derived pursuant to water supply contracts with the cities, water districts, water associations, political subdivisions, or other public bodies as provided in KRS 74.420 to 74.520. For that purpose the commission may issue revenue bonds and be vested with all of the powers, duties, and responsibilities, including the power of condemnation, delegated and granted to a "governmental agency" under the terms and provisions of KRS Chapter 58, as the law now exists or as it may hereafter be amended. Under the law, the term "governmental agency" means the "commission" and the term "public project" means "sources of supply of water."

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122. sec. 6. effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207. sec. 6. effective June 16, 1960.

74.480 Exclusive water supply -- Basis for establishing rate, charges.

- (1) When a commission has been created, the cities, water associations, or water districts represented by the commission shall contract with the commission for water and the contracts may provide that the sources of supply of water of the commission shall be the exclusive water supply for the respective water distribution systems. These cities, water associations, or water districts shall establish charges and rates for water supplied by them to consumers sufficient at all times:
 - (a) To pay the principal of and interest on all outstanding obligations of the cities, water associations, or water districts which by their terms are payable in any manner from the revenues of their respective waterworks distribution systems; and
 - (b) To pay the cost of operation and maintenance of their respective waterworks distribution systems, including the payments to be made to the commission pursuant to contracts for the purchase of water by those cities, water associations, or water districts.
- (2) The commission shall establish charges and rates for water supplied to those cities, water associations, or water districts represented by the commission sufficient at all times:
 - (a) To pay the principal of and interest on the revenue bonds issued by the commission under the provisions of KRS 74.420 to 74.520;
 - (b) To pay the cost of operation and maintenance of the sources of supply of water; and
 - (c) To provide an adequate fund for renewals, replacements, and reserves.Contracts entered into between the commission and the cities, water associations, or water districts shall include covenants for the establishment of rates and charges as provided in this section.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 7, effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207, sec. 7, effective June 16, 1960.

74.490 Commission may contract to supply other public bodies.

The commission shall also have the right to supply water to any city, water association, water district, political subdivision, or other public body, or any water distribution system regulated by the Public Service Commission, in addition to the cities, water associations, or water districts which are represented by the commission, upon the payments, terms, and conditions mutually agreed upon. No capital expenditures shall be made by the commission for the purpose of furnishing water to the other party or parties. Any contract entered into to supply water to a city, water association, water district, political subdivision, or other public body shall provide that payments to be made thereunder shall be solely from the revenues to be derived by the city, water district, political subdivision, or other public body from the operation of the water works distribution system thereof; and the contract shall be a continuing, valid, and binding obligation of the city, water district, political subdivision, or other public body, payable from the revenues for a period of years, not to exceed fifty (50), as provided in the contract. Any contract shall not be a debt of any city, water association, water district, political subdivision, or other public body within the meaning of any statutory or constitutional limitations.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122. sec. 8. effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207. sec. 8. effective June 16, 1960.

74.500 Procedure for participation by other city or water districts.

After the creation of a water commission provided for by KRS 74.420 to 74.520, a city or water district which did not participate in the creation of said commission may participate in its operation and appoint a commissioner to serve on said commission in the following manner:

- (1) The governing body of such city or water district shall adopt and file with the county judge/executive who entered the order creating said commission an ordinance or resolution electing and requesting that it be permitted to be included in and represented by said commission in the same manner and to the same extent as if said city or water district had originally participated in the creation of said commission.
- (2) Upon such filing the county judge/executive shall by appropriate order set a date for a public hearing on the inclusion of such a city or water district in said commission, and shall give notice of such public hearing in the manner as provided by KRS 74.440. Any resident of the city or water district at the time represented by said commission, and any resident of the city or water district requesting to be included in and represented by said commission and to participate in its operation, may file objections, and at the public hearing if the county judge/executive finds that the inclusion of such city or water district in said commission is reasonably necessary or advantageous for the public health, convenience and comfort of the residents of all cities and water districts represented by said commission, including the city or water district requesting to be included in said commission, and provided further that there shall be on file with the county judge/executive a resolution adopted by said commission evidencing its willingness to have such city or water district included in and represented by said commission the county judge/executive shall make an order authorizing the inclusion of such city or water district in the commission. If the county judge/executive does not find that the inclusion of such city or water district is reasonably necessary or advantageous he shall make an appropriate order in this regard. Any party in interest may thereupon appeal to the Circuit Court.
- (3) Upon the entering of the order by the county judge/executive authorizing the inclusion of such city or water district in said commission the number of commissioners, if any, to be appointed to said commission by the county judge/executive shall be reduced by one (1) and the presiding officer, with the approval of the governing body of the city or water district which shall by virtue of said proceedings be included in and represented by said commission, shall appoint a commissioner whose term shall begin at the expiration of the term of the commissioner appointed by the county judge/executive whose term shall first expire. In the event there is no commissioner on said commission appointed by the county judge/executive the term of the commissioner appointed by the presiding officer of such city or water district shall be fixed so that the terms of approximately one-third (1/3) of the commissioners will expire in each year.

Effective: June 17, 1978

History: Amended 1978 Ky. Acts ch. 384, sec. 194, effective June 17, 1978. --
Created 1960 Ky. Acts ch. 207, sec. 9, effective June 16, 1960.

74.510 Commission declared not to constitute a utility.

Since the activities of a commission created pursuant to KRS 74.420 to 74.520 are limited to the supply of water under contract to cities or to water distribution systems which are regulated by the Public Service Commission, including water districts and water associations, as provided in KRS 74.420 to 74.520, and such a commission has no authority to supply water to individual private consumers, such a commission shall not be deemed to constitute a "utility" or "person" within the meaning and application of KRS Chapter 278 and a commission shall not be subject to the jurisdiction of the Public Service Commission.

Effective: July 15, 1996

History: Amended 1996 Ky. Acts ch. 122, sec. 9, effective July 15, 1996. -- Created 1960 Ky. Acts ch. 207, sec. 10, effective June 16, 1960.

74.520 Construction of KRS 74.420 to 74.520.

KRS 74.420 to 74.520 shall constitute full and complete authority for the creation of water commissions and for carrying out the powers and duties of same as provided in KRS 74.420 to 74.520. The provisions of KRS 74.420 to 74.520 shall be liberally construed to accomplish its purpose and no procedure or proceedings, notices, consents or approvals, shall be required in connection therewith except as may be prescribed by KRS 74.420 to 74.520. Every water commission organized under KRS 74.420 to 74.520 is declared to be a public body created and functioning in the interest and for the benefit of the public, and its property and income and any bonds issued by it and income therefrom shall be exempt from taxation.

Effective: June 16, 1960

History: Created 1960 Ky. Acts ch. 207, sec. 11, effective June 16, 1960.

Appendix B
Hydraulic Calculations & Profiles

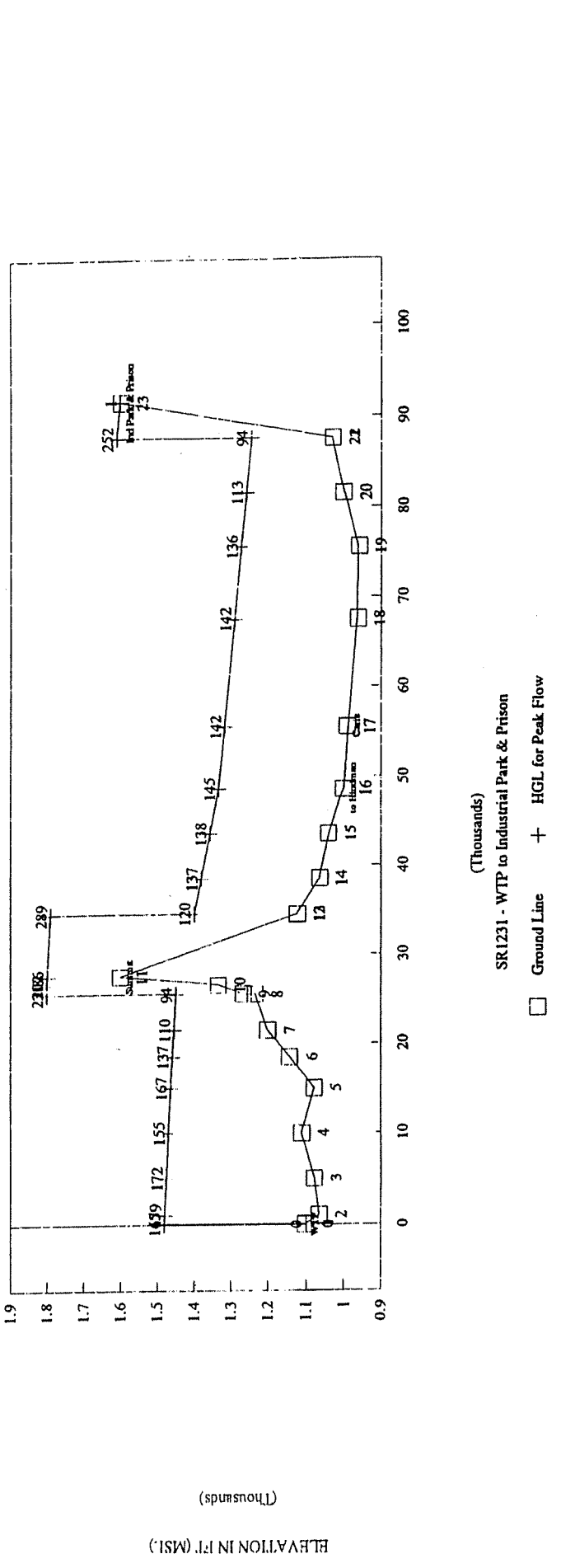
Project Title :
 Profiled Route Name :
 File Name :
 Average Usage/Customer :

Regional Water Supply
 Transmission Mains, Pumps & Tanks
 SR1231 - WTP to Industrial Park & Prison
 3391_2PS PRO
 0.1141552 gpm or 5000 gal/mo

Parallel Pipe Equivalent Diameter Calculation Table

DESCRIPTION	WTP	NUMBER	ELEVATION	CLUST/NODE	SPECIAL DEMANDS	PEAK	AVERAGE	NUMBER	LENGTH	DIAMETER	C-VALUE	K-VALUE	PUMP TDH	PRV HGL
		0	1100					1	20	16.00	140	0.9	380	
		1	1100					2	1000	16.00	140	0.9		
		2	1065					3	4000	16.00	140	0.40		
		3	1078					4	5000	16.00	140	0.50		
		4	1111					5	5000	16.00	140	0.50		
		5	1078					6	3500	16.00	140	0.35		
		6	1143					7	3000	16.00	140	0.30		
		7	1200					8	4000	16.00	140	0.40		
		8	1233.5					9	20	16.00	140	0.00	350	
		9	1267					10	1000	16.00	140	0.10		
		10	1334					11	1000	16.00	140	0.10		
		11	1600					12	7000	16.00	140	0.70		
		12	1123					13	20	16.00	140	0.00		1400
		13	1123					14	4000	12.00	140	0.40		
		14	1064					15	5000	12.00	140	0.50		
		15	1064			500		16	5000	12.00	140	0.50		
		16	1000					17	7000	12.00	140	0.70		
		17	990					18	12000	12.00	140	1.20		
		18	963					19	8000	12.00	140	0.80		
		19	960					20	6000	12.00	140	0.60		

*****NODE DATA*****
 *****PIPE DATA*****
 Beginning Grade (ft MSL) = 1100
 Pressure = 80



Project Title: Regional Water Supply
 Profiled Route Name: SR1231 - WTP to Industrial Park & Prison
 File Name: 1231_prv.PRO
 Average Usage/Customer: 5000 gal/mo

Parallel Pipe Equivalent Diameter Calculation Table

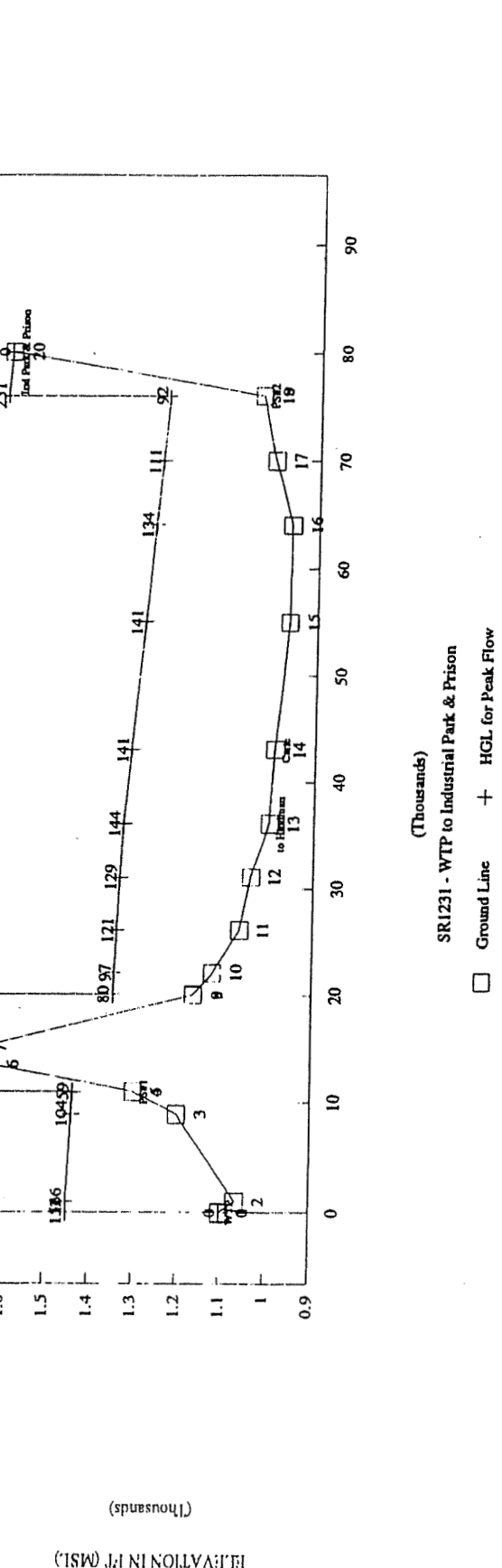
Length	Dia	C-Value
13540	16	140
13540	6	140
13540	16.45	140

Beginning Grade (ft MSL) = 1100
 Pressure = 80

DESCRIPTION	NUMBER	ELEVATION	CUSTOMER	PEAK	AVERAGE	NUMBER	LENGTH	DIAMETER	C-VALUE	K-VALUE	PUMPION	PRV HGL
WTP	0	1100				1	20	16.00	140	0.9	350	
	1	1100				2	1000	16.00	140	0.9		
	2	1065				3	8000	16.00	140	0.80		
	3	1200				4	2000	16.00	140	0.20		
	4	1300				5	20	16.00	140	0.00		
	5	1300				6	2500	16.00	140	0.25		315
	6	1626				7	1500	16.00	140	0.15		
	7	1654				8	5000	16.00	140	0.50		
	8	1165				9	20	16.00	140	0.00		1350
	9	1165				10	2000	16.00	140	0.20		
	10	1123				11	4000	16.00	140	0.40		
	11	1064				12	5000	16.00	140	0.50		
	12	1040				13	5000	16.00	140	0.50		
	13	1000	500			14	7000	12.00	140	0.70		
	14	990				15	12000	12.00	140	1.20		
	15	963				16	9000	12.00	140	0.90		
	16	960				17	6000	12.00	140	0.60		
	17	1000				18	6000	12.00	140	0.60		
	18	1030				19	20	12.00	140	0.00		368
	19	1030				20	4000	12.00	140	0.40		
	20	1600				21						

*****SPECIAL DEMANDS*****
 Regional Water Supply
 Transmission Mains, Pumps & Tanks

*****PIPE DATA*****
 Regional Water Supply
 Transmission Mains, Pumps & Tanks



Project Title :
 Profiled Route Name :
 File Name :
 Average Usage/Customer :
 Regional Water Supply
 Transmission Mains, Pumps & Tanks
 Hindman to Pippa Passes
 Pippapas .PRO
 0.1141552 gpm or 5000 gal/mo
 Beginning Grade (ft. MSL) = 1450
 Pressure = 1450
 PRV HGL

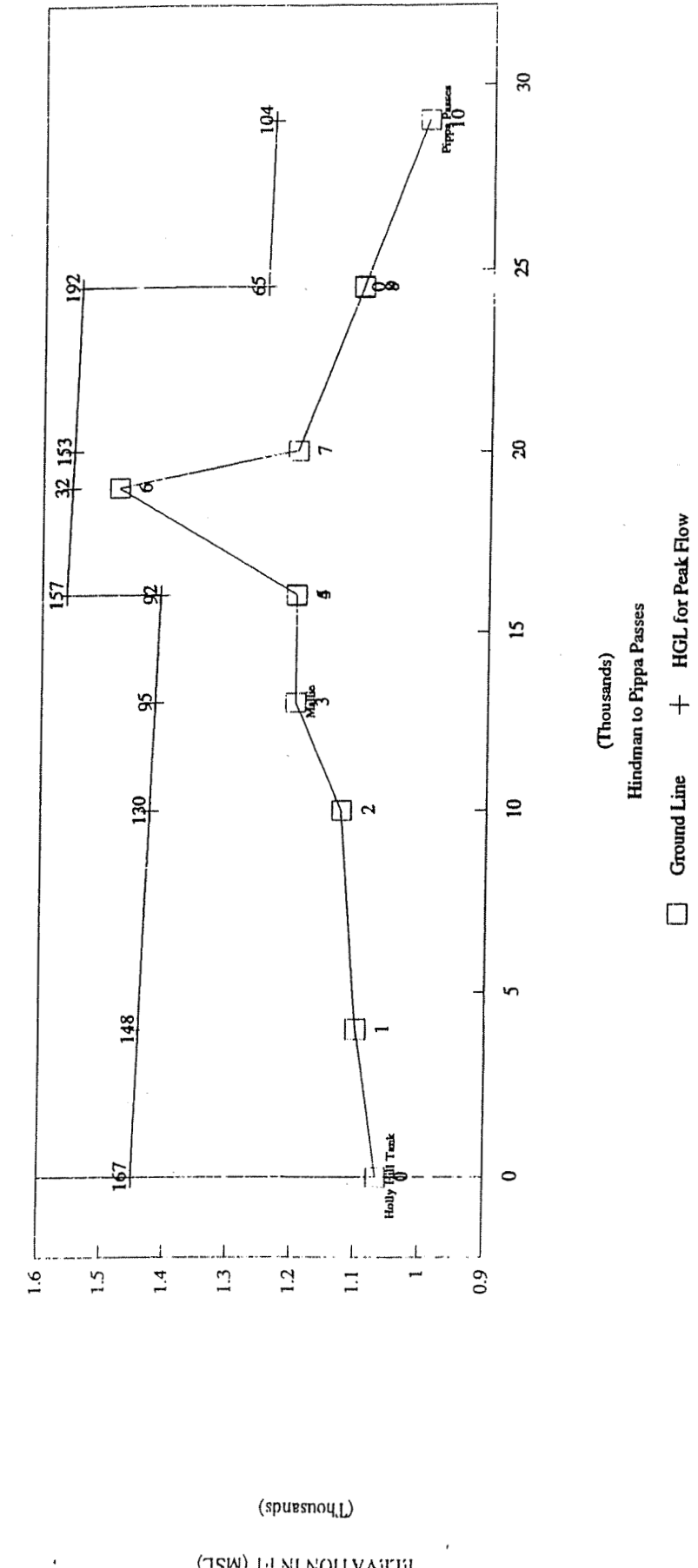
*****NODE DATA*****

NUMBER	ELEVATION	CUST/NODE	PEAK	AVERAGE
0	1066			
1	1100			
2	1126			
3	1200			
4	1200			
5	1200			
6	1480			
7	1200			
8	1100			
9	1100			
10	1000		350	
11				

*****PIPE DATA*****

NUMBER	LENGTH	DIAMETER	C-VALUE	K-VALUE	PUMP TDH	PRV HGL
1	4000	8.00	140	0.9		
2	6000	8.00	140	0.9		
3	3000	8.00	140	0.30		
4	3000	8.00	140	0.30		
5	20	4.00	130	0.00	150	
6	3000	8.00	140	0.30		
7	1000	8.00	140	0.10		
8	4500	8.00	140	0.45		
9	20	4.00	140	0.00		1250
10	4500	8.00	140	0.45		
11						
12						

Regional Water Supply
 Transmission Mains, Pumps & Tanks

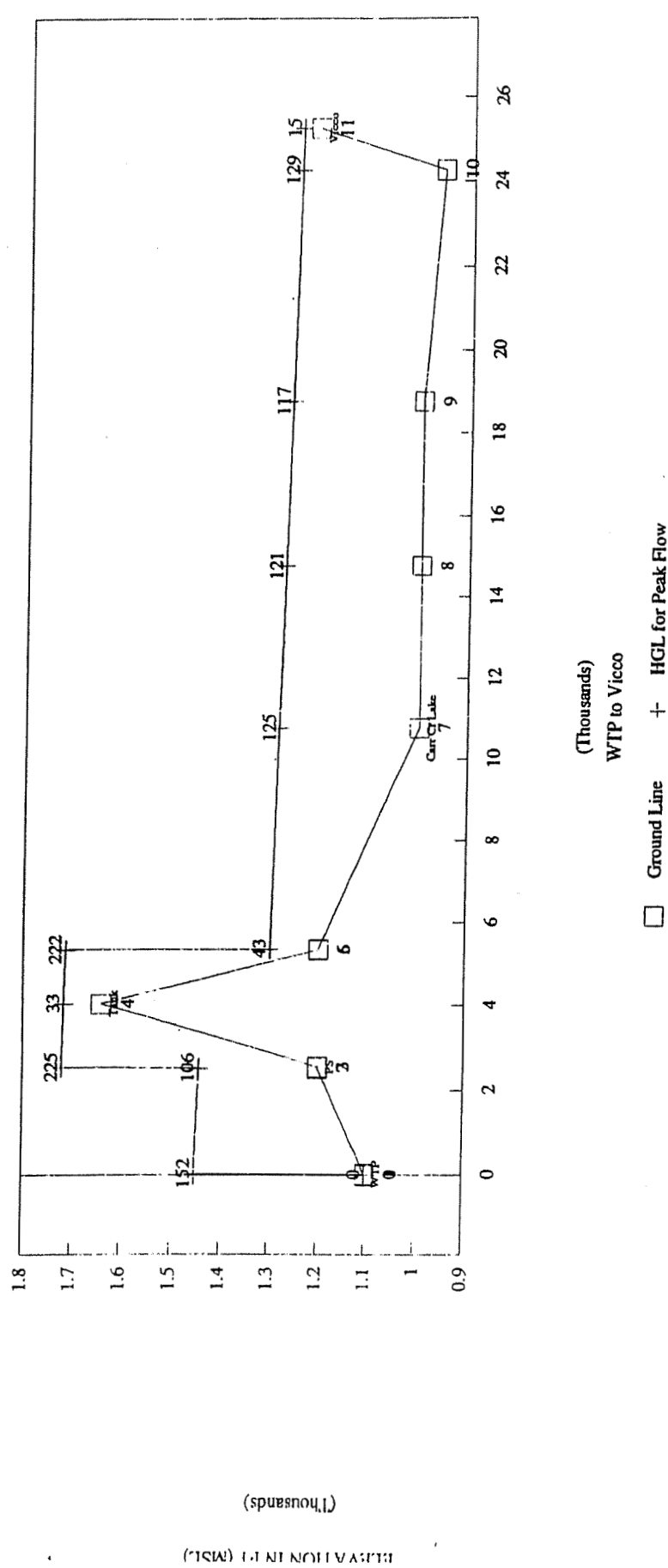


(Thousands)
 Hindman to Pippa Passes
 □ Ground Line + HGL for Peak Flow

Project Title:
 Profile Name:
 Average Usage/Customer:
 Regional Water Supply
 Transmission Mains, Pumps & Tanks
 WTP to Vicco
 Vicco
 .PRO
 0.1141552 gpm or 5000 gal/mo
 Beginning Grade (ft MSL) = 1100
 Pressure = 80

DESCRIPTION	NUMBER	ELEVATION	CUST/NODE	PEAK	AVERAGE	NUMBER	LENGTH	DIAMETER	C-VALUE	K-VALUE	PCMP TDH	PRV HGL
WTP	0	1100				1	20	8.00	140	0.9	350	
ST Cr Lake	1	1100				2	2500	8.00	140	0.9		
	2	1200				3	20	8.00	140	0.00		
	3	1200				4	1500	8.00	140	0.15	275	
	4	1640				5	1300	8.00	140	0.13		
	5	1200				6	20	8.00	140	0.00		
Vicco	6	1200				7	5400	8.00	140	0.54		
	7	1000				8	4000	8.00	140	0.40		
	8	1000				9	4000	8.00	140	0.40		
	9	1000				10	5500	8.00	140	0.55		
	10	960				11	1000	8.00	140	0.10		
	11	1220				12						
					350							

Regional Water Supply
 Transmission Mains, Pumps & Tanks



(Thousands)
 WTP to Vicco
 □ Ground Line + HGL for Peak Flow

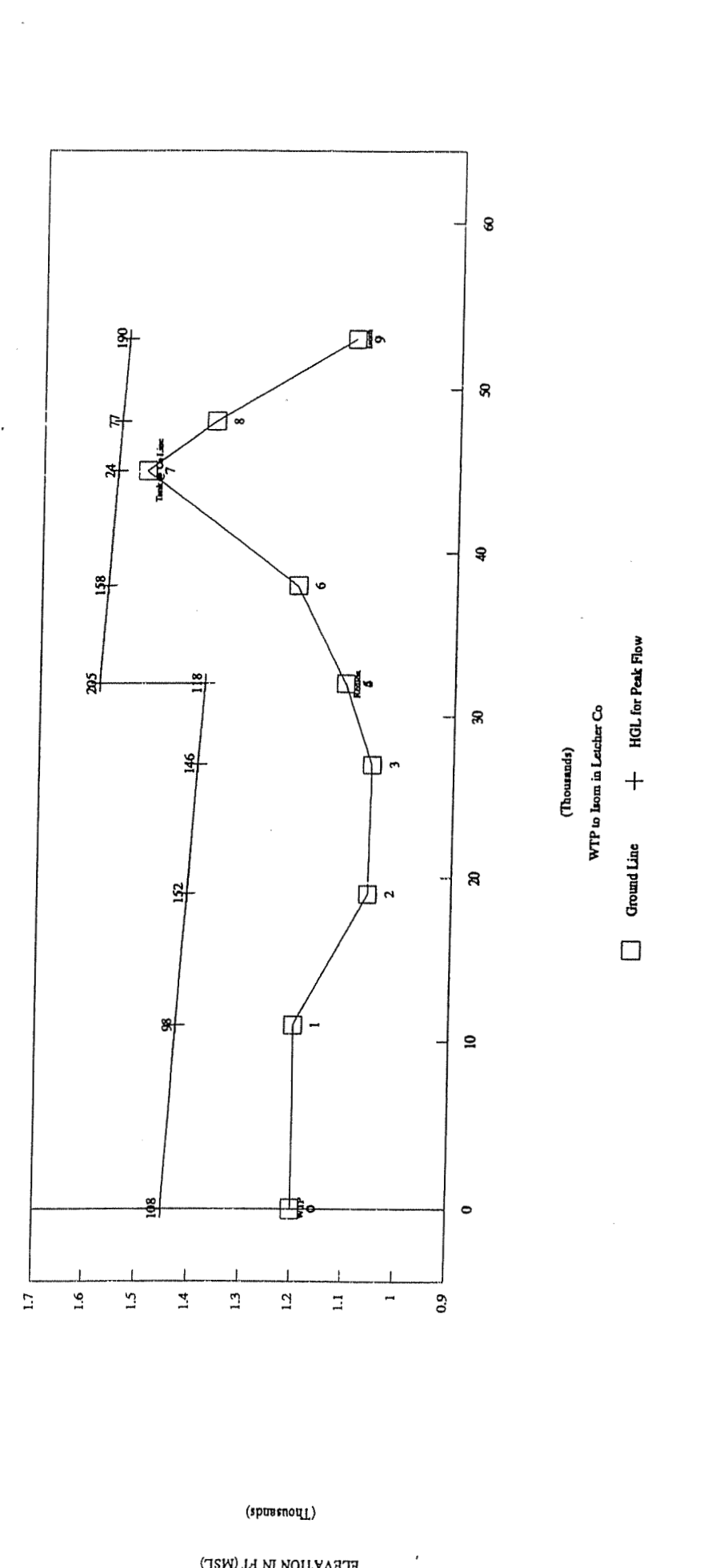
Project Title : Profile Data Input Range Regional Water Supply HL (ft) = -88.1181

Profiled Route Name : Transmission Mains, Pumps & Tanks
 File Name : WTP to Isom in Letcher Co
 Average Usage/Customer : Letcher .PRO
 0.1141552 gpm or 5000 gal/mo

Beginning Grade (ft MSL) = 1450
 Pressure = *****

DESCRIPTION	NUMBER	ELEVATION	CUST/NODE	SPECIAL DEMANDS	PEAK	AVERAGE	NUMBER	LENGTH	DIAMETER	C-VALUE	K-VALUE	PUMPTDTH	FRV HGL
WTP	0	1200					1	11000	10.00	140	0.9		
	1	1200					2	8000	10.00	140	0.9		
	2	1060					3	8000	10.00	140	0.80		
	3	1056					4	5000	10.00	140	0.50		
	4	1110					5	20	10.00	140	0.00		200
	5	1110					6	6000	10.00	140	0.60		
	6	1206					7	7000	10.00	140	0.70		
	7	1500					8	3000	10.00	140	0.30		
	8	1370					9	5000	10.00	140	0.50		

Regional Water Supply
 Transmission Mains, Pumps & Tanks



Appendix C
Corps of Engineers Data & Calculations

ALTERNATIVES

INTRODUCTION

The principal purpose of this study is to identify the impacts of reallocation of storage in Carr Creek Lake for water supply purposes. A range of storage scenarios is considered for evaluation by local leaders to determine their interest in using Carr Creek Lake as a future water source. An alternative source, a single purpose water supply impoundment is also evaluated as a means of comparing the costs of using Carr Creek Lake. The site of this impoundment is on Line Fork which is a tributary to the North Fork near the Perry-Letcher County line. A secondary purpose of this study is to provide information on the treatment of raw water from the considered new source to serve the study area. This entails the design and development of costs for a regional water treatment plant and distribution lines to the existing service area.

WATER SUPPLY ALTERNATIVES

Local leaders have requested that Carr Creek Lake be considered as a source of water for the area and possibly an upstream water supply impoundment. These recommendations were based, at least partially, on past studies which have identified inadequate ground water and stream flows for any significant future water source. As much as an additional 10 MGD will be needed by the year 2020.

Carr Creek Lake Analysis

Carr Creek Reservoir was authorized by the Flood Control Act of October 1962 (Public Law 87-874, 87th Congress), and was placed in operation in January 1976. Carr Creek Lake is operated for flood control, water quality, fish and wildlife enhancement, and recreation. The operating levels at the time the project was constructed are provided below.

Operating Levels

Pool	Elevation Of Pool	Capacity (Acre-Feet)	Area (Acres)	Backwater Main Stream (Length-Mile)
Minimum	1,009	11,810	530	6.3
Water Quality	1,009-1,017	4,330	590	6.3-7.0
Seasonal	1,017-1,027	6,480	710	7.0-8.2
Flood Control	1,017-1,055	31,560	1,120	7.0-10.1
Total Storage	1,055	47,700	1,120	10.1

In connection with this study, two actions were taken that influence the capability of the lake to furnish water supply storage space. A sedimentation survey was conducted to provide current information on accumulated sediment in the lake and a determination of the sedimentation rate. The second involved coordination with Kentucky Water Resources Branch concerning the criteria for the original determination of water quality releases in view of current standards/policies. The results of sedimentation studies and the review of water quality releases are furnished to establish the setting for meeting water quality and potential water supply demands.

Sedimentation Studies

The lake includes in its storage allocations a reserve for sedimentation. During the 1970s, strip mining became widespread in eastern Kentucky and with it the potential for large increases in sediment loads. To provide some protection to the lake from these potential increases in sediment, sediment dams were constructed on Defeated Creek, Shingle Branch and Little Carr Fork. These small sediment traps have a combined capacity of about 250 acre-feet for sediment storage. In 1996, about 150 acre-feet of sediment had accumulated in these traps. Although this has effectively extended the life of the project, a far larger impact is the current sedimentation rate recently

determined by sedimentation surveys conducted in 1984, 1988 and 1996, which established that the current sedimentation rate is considerably less than what was projected. If the average rate for these three surveys is used for a 100 year period, a storage capacity of 7,820 acre-feet would accommodate the resulting accumulation. A revised (1996) Operating Levels table based on results of the sedimentation surveys follows.

Operating Levels

Pool	Elevation Of Pool	Capacity (Acre-Feet)	Area (Acres)	Backwater Main Stream (Length-Mile)
Minimum	1,009	11,170	479	6.3
Water Quality →	1,009-1,017	4,110	556	6.3-7.0
Seasonal	1,017-1,027	6,300	688	7.0-8.2
Flood Control	1,017-1,055	30,890	1,112	7.0-10.1
Total Storage	1,055	46,170	1,112	10.1

A result of the changes in the elevation-storage capacities and the sedimentation rate indicates that a sediment pool to elevation 1002 is adequate. Therefore, storage between elevation 1002 and 1009, 3,070 acre-feet, could be used for water supply purposes without impacting other authorized purposes.

Water Quality Releases

Carr Creek Lake was designed to provide flow improvement on the North Fork of the Kentucky River at Hazard, Kentucky. Water quality storage of 4,300 acre-feet (4,110 acre-feet per 1996 survey) was provided to meet a seasonably-varied flow criteria of 25 cubic feet per second (cfs) (outflow never less than 5 cfs and firm flows at Hazard of 22 cfs in April through June; 25 cfs in July through September; and 10 cfs in October and November). As part of this study, the Corps asked the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet, Water Resources Branch, to review these criteria based on current standards. Following this review, the State modified the criteria to a minimum release of 5 cfs from Carr Creek Lake and a

minimum desired flow at Hazard of 15 cfs year-round. Storage requirement to meet the 15 cfs year-round criteria for the 1930-31 drought conditions was computed. Results of this single purpose (water quality only) hypothetical operation indicate that the 15 cfs year-round plan requires about 25% less storage. This reduction in storage required to meet a single purpose water quality demand and the synergistic impact, when combined with a water supply demand, is discussed further in the following section.

Storage Analysis

Three water supply demands were analyzed (5, 10, and 15 MGD) in combination with the revised (15 cfs year-round) water quality criteria. Water supply requirements were determined for each of the demands for two different scenarios: one - as a direct withdrawal from Carr Creek Lake and two - as a supplementation of flow in the North Fork of the Kentucky River below the confluence with Carr Fork (Hazard, Kentucky) for a downstream intake. All design events (1930-31 drought) were studied using "critical year" evaporation rates. All routings to reflect long term operational impact were based on estimated Carr Creek Lake inflows for the period April 1941 through July 1996 and monthly average evaporation rates. Transmission losses of releases, between the lake and the water intake site during drought conditions, were assumed to be about 5 percent. Therefore, demands of 5, 10 and 15 million gallons per day would require lake releases of up to 8, 16 and 24 cubic feet per second, respectively. Storage to provide these flows also has to provide a proportion of the lake's evaporation losses. In the case of reallocation of storage for water supply purposes, this purpose also has a proportional amount of sediment storage assigned to it. Storage requirements determined for the 1930-31 design

drought for the various plans considered appear in the following Table 15. The plan for 15 MGD, as a withdrawal from the lake, required a water supply/water quality pool of elevation 1032. Since this would require significant modification of recreational facilities and additional associated costs and impacts to recreation, it was eliminated from consideration.

TABLE 15

Sediment Pool WS/WQ Pool Elevation	Water Supply and Water Quality Storage Required (In Acre-Feet)			Total Required Water Supply Allocation ³	
	Plan	Water Supply	Water Quality		Total Storage
1002-1017	5 MGD ¹	2986	4203	7189	3620
1002-1019	5 MGD ²	4324	4012	8336	5242
1002-1022	10 MGD ¹	6248	3932	10180	7575
1002-1026	10 MGD ²	8825	3945	12770	10700
1002-1027	15 MGD ¹	9513	3977	13490	11534

Proposed Sediment Pool Elevation/Storage 1002-8090 Acre-Feet
 Elevation/Total Storage at Flood Control Pool 1055-46168 Acre-Feet
 Revised Water Quality Criteria - 15 cfs year-round at Hazard

¹ Augmentation of stream flow for intake site on North Fork Kentucky River

² Withdrawal directly from the lake

³ Includes allocated sedimentation storage

Table 16 shows the maximum drawdown associated with each considered plan. The first elevation reflects the drawdown that would occur with a repeat of conditions estimated for the 1930-31 drought (this included some inflow/spring recharge). The second set of elevations reflects the drawdown that would have occurred had there been no spring recharge (dependable storage).

TABLE 16

Water Quality/ Water Supply Pool Elevation	Plan	DESIGN EVENT DRAWDOWN	
		Actual Event	Drawdown Elevation 1930-31 Without Spring Recharge
1017	15cfs W.Q.+5 MGD@Hazard	1009.92	1001.74
1019	15cfs W.Q.+5 MGD Withdrawal	1007.23	1001.37
1022	15cfs W.Q.+10 MGD@Hazard	1008.94	1001.74
1026	15cfs W.Q.+10 MGD Withdrawal	1003.28	1001.66
1027	15cfs W.Q.+15 MGD@Hazard	1001.63	1001.63

All design water supply and water quality demands for each scenario can be accommodated by Carr Creek Lake without changes to the lake's recreational facilities. However, changing the winter pool above the current level of 1017 will impact the flood control and recreation purposes of the project. Also, recreation purposes would be impacted by drawdowns during drought periods. These impacts are explained and quantified in the Plan Evaluation Section of this report. Costs associated with reallocation of storage space for water supply purposes are also included in the evaluation section.

Single Purpose Water Supply - Line Fork

A reservoir site to provide water to the regional treatment plant was investigated as an alternative to using water supply storage in Carr Creek Lake. The North Fork of the Kentucky River Basin drainage area above Hazard, Kentucky, was inspected for a site that would provide the optimum potential. Each prospective site was analyzed with regard to size (a drainage area similar to that of Carr Creek Lake is necessary to support future water supply demands), to degree of development within the basin (the greater the development, the poorer the alternative), and to the characteristics or shape of the valley in the vicinity of the damsite. A site on Line Fork at mile 3.9 was found to best fit the requirements for this alternative. Also, a previous flood reduction study for Hazard identified a similar site on Line Fork as an alternative flood reduction measure. Environmental factors, which are significant for the Line Fork site, were not accounted for in this initial analysis. This analysis was performed to establish an approximate cost range for a single purpose water supply reservoir as a "yardstick" comparison to use of Carr Creek Lake.

General

Line Fork with a drainage area of 65.3 square miles is a tributary to the North Fork of the Kentucky River at mile 127. The drainage area at the damsite (mile 3.9) is 60.3 square miles,

TABLE 22-A
 CARR CREEK LAKE, KENTUCKY
 ALLOCATION OF COSTS
 FOR 5 MGD WATER SUPPLY
 DRAWN FROM KY RIVER AT HAZARD

A. Total Actual Joint-Use Costs at Time of Construction	\$ 44,827,580
B. Total Updated Joint-Use Costs ^{1/}	\$162,147,823
C. Percent of Storage Allocated to Water Supply	

<u>5 MGD Total Water Supply Storage</u>	=	<u>2,986 acre-feet ^{2/}</u>	=	7.84%
Total Usable Project Storage		38,078 acre-feet		

D. Updated Joint-Use Cost Allocated to Water Supply Considerations	\$12,712,389
(\$162,147,823 x 7.84% = \$12,712,389)	

E. Procedure for Calculating Annual Operation and Maintenance (O&M)
 Cost for Water Supply:

Annual O&M Payment (Water Supply) = Actual Experienced FY96
 Joint-Use O&M Cost for Project x 7.84%

= \$962,374 ^{3/} x 7.84% = \$75,450 ^{4/}

1/ October 1996 price level. See Table 23 for derivation.

2/ Addition of water supply storage to Carr Creek Lake to provide supplemental flow to North Fork Ky. River for total water supply flow of 5 MGD at Hazard.

3/ FY96 O&M without Recreation

4/ Represents first year annual O&M payment for water supply for a contract executed between October 1, 1996 and September 30, 1997 (Fiscal Year 1997).

TABLE 22-B
CARR CREEK LAKE, KENTUCKY
ALLOCATION OF COSTS
FOR 5 MGD WATER SUPPLY
DRAWN FROM LAKE

A. Total Actual Joint-Use Costs at Time of Construction	\$44,827,580
B. Total Updated Joint-Use Costs ^{1/}	\$162,147,823
C. Percent of Storage Allocated to Water Supply	
$\frac{\text{5 MGD Total Water Supply Storage}}{\text{Total Usable Project Storage}} = \frac{4,324 \text{ acre-feet}}{38,078 \text{ acre-feet}} = 11.36\%$	

D. Updated Joint-Use Cost Allocated to Water Supply Considerations \$18,419,993
(\$162,147,823 x 11.36% = \$18,419,993)

E. Procedure for Calculating Annual Operation and Maintenance (O&M)
Cost for Water Supply:

$$\begin{aligned} &\text{Annual O\&M Payment (Water Supply) = Actual Experienced FY96} \\ &\text{Joint-Use O\&M Cost for Project} \quad \times \quad 11.36\% \\ &= \quad \$962,374 \text{ } ^{2/} \quad \times \quad 11.36\% \quad = \quad 109,326 \text{ } ^{3/} \end{aligned}$$

1/ October 1996 price level. See Table 23 for derivation.

2/ FY96 O&M without Recreation

3/ Represents first year annual O&M payment for water supply for a contract executed between October 1, 1996 and September 30, 1997 (Fiscal Year 1997).

TABLE 22-C
CARR CREEK LAKE, KENTUCKY
ALLOCATION OF COSTS
FOR 10 MGD WATER SUPPLY
DRAWN FROM KY RIVER AT HAZARD

A. Total Actual Joint-Use Costs at Time of Construction	\$ 44,827,580
B. Total Updated Joint-Use Costs ^{1/}	\$162,147,823
C. Percent of Storage Allocated to Water Supply	
<u>10 MGD Total Water Supply Storage</u> = <u>6,248 acre-feet</u> ^{2/} = 16.41% Total Usable Project Storage 38,078 acre-feet	
D. Updated Joint-Use Cost Allocated to Water Supply Considerations	\$26,608,458
(\$162,147,823 x 16.41% = \$26,608,458)	
E. Procedure for Calculating Annual Operation and Maintenance (O&M) Cost for Water Supply:	
Annual O&M Payment (Water Supply) = Actual Experienced FY96 Joint-Use O&M Cost for Project x 16.41%	
= \$962,374 ^{3/} x 16.41% = \$157,926 ^{4/}	

1/ October 1996 price level. See Table 23 for derivation.

2/ Addition of water supply storage to Carr Creek Lake to provide supplemental flow to North Fork Ky. River for total water supply flow of 10 MGD at Hazard.

3/ FY96 O&M without Recreation

4/ Represents first year annual O&M payment for water supply for a contract executed between October 1, 1996 and September 30, 1997 (Fiscal Year 1997).

TABLE 22-D
CARR CREEK LAKE, KENTUCKY
ALLOCATION OF COSTS
FOR 10 MGD WATER SUPPLY
DRAWN FROM LAKE

A. Total Actual Joint-Use Costs at Time of Construction	\$ 44,827,580
B. Total Updated Joint-Use Costs ^{1/}	\$162,147,823
C. Percent of Storage Allocated to Water Supply	

<u>10 MGD Total Water Supply Storage</u>	=	<u>8,825 acre-feet</u>	=	23.18%
Total Usable Project Storage		38,078 acre-feet		

D. Updated Joint-Use Cost Allocated to Water Supply Considerations	\$37,585,865
(\$162,147,823 x 23.18% = \$37,585,865)	

E. Procedure for Calculating Annual Operation and Maintenance (O&M)
 Cost for Water Supply:

Annual O&M Payment (Water Supply) = Actual Experienced FY96
 Joint-Use O&M Cost for Project x 23.18%

= \$962,374 ^{2/} x 23.18% = \$223,078 ^{3/}

1/ October 1996 price level. See Table 23 for derivation.

2/ FY96 O&M without Recreation

3/ Represents first year annual O&M payment for water supply for a contract executed between October 1, 1996 and September 30, 1997 (Fiscal Year 1997).

TABLE 22-E
CARR CREEK LAKE, KENTUCKY
ALLOCATION OF COSTS
FOR 15 MGD WATER SUPPLY
DRAWN FROM KY RIVER AT HAZARD

A. Total Actual Joint-Use Costs at Time of Construction	\$ 44,827,580
B. Total Updated Joint-Use Costs ^{1/}	\$162,147,823
C. Percent of Storage Allocated to Water Supply	
$\frac{\text{15 MGD Total Water Supply Storage}}{\text{Total Usable Project Storage}} = \frac{\text{9,513 acre-feet } ^{2/}}{\text{38,078 acre-feet}} = 24.98\%$	
D. Updated Joint-Use Cost Allocated to Water Supply Considerations	\$40,504,526
$(\$162,147,823 \times 24.98\% = \$40,504,526)$	

E. Procedure for Calculating Annual Operation and Maintenance (O&M) Cost for Water Supply:

Annual O&M Payment (Water Supply) = Actual Experienced FY96
Joint-Use O&M Cost for Project x 24.98%

= \$962,374 ^{3/} x 24.98% = \$240,401^{4/}

1/ October 1996 price level. See Table 23 for derivation.

2/ Addition of water supply storage to Carr Creek Lake to provide supplemental flow to North Fork Ky. River for total water supply flow of 15 MGD at Hazard.

3/ FY96 O&M without Recreation

4/ Represents first year annual O&M payment for water supply for a contract executed between October 1, 1996 and September 30, 1997 (Fiscal Year 1997).

TABLE 23
CARR CREEK LAKE, KENTUCKY
JOINT-USE CONSTRUCTION COST UPDATING

	Construction Actual Cost 2/	CWCCIS 1/ FY71 3/ FY97		Factor for FY71 to FY97	Construction Cost FY97
Lands & Damages	\$11,990,635	----	---	3.58 4/	\$42,960,818
Relocations	24,505,865	134.70	490.66	3.64	89,265,388
Reservoir	1,082,598	146.60	518.89	3.54	3,831,850
Dams	6,465,516	132.02	476.10	3.61	23,316,408
Roads, Railroads and Bridges	77,931	134.70	490.66	3.64	283,872
Buildings, Grounds and utilities	586,179	131.73	465.14	3.53	2,069,804
Permanent Opera- ting Equipment	<u>118,856</u>	131.73	465.14	3.53	<u>419,682</u>
TOTALS	\$44,827,580				\$162,147,823

1/ Civil Works Construction Cost Index System

2/ Costs included overhead allocations where applicable; Engineering, Design, Supervision and Administration costs distributed.

3/ Computed mid-point of construction is Dec 1970.

4/ Weighted Average of CWCCIS factors for other features.

SUMMARY OF WATER SUPPLY LEGISLATION AND PROCEDURES

THE FEDERAL INTEREST IN WATER SUPPLY

National policy concerning the U.S. Army Corps of Engineers (Corps) roles in water supply has been developed over a number of years and is still being clarified and extended by legislation. This policy is based on a recognition that states and local sponsors have the primary responsibility in the development and management of their water supplies. The policy also recognizes a significant but declining Federal interest in the long range management of water supplies and assigns the financial burden of supply to users. The Corps may, however, participate and cooperate with the states and local sponsors in developing water supplies in connection with water resource improvements for construction, operation, maintenance, and modification of Federal navigation, flood control, or multipurpose projects when certain conditions of non-Federal participation are met. Five of the more significant legislative landmarks are discussed in the following paragraphs. These laws are of major significance to the Corps mission in water supply planning in that they gave the Corps authority to use their reservoirs for surplus water, agricultural water supply and water supply storage.

SECTION 6, 1944 FLOOD CONTROL ACT

Under Section 6 of the 1944 Flood Control Act (Public Law 78-534), the Secretary of the Army is authorized to enter into agreements for surplus water with states, municipalities, private concerns, or individuals at such prices and on such terms as he may deem reasonable. These agreements may be for domestic, municipal, and industrial uses, but not for crop irrigation, from surplus water that may be available at any reservoir under the control of the Department of the Army.

SECTION 8, 1944 FLOOD CONTROL ACT

Original Authorization

Under Section 8 of the 1944 Flood Control Act (Public Law 78-534), Corps lakes in the 17 western states in which the reclamation law applies may include irrigation as a project purpose upon the recommendation of the Secretary of the Interior in the conformity with reclamation law. Section 8 also provides that the Secretary of the Interior may provide needed irrigation works to make use of irrigation storage. It is the Department of Interior's responsibility to construct, operate, and maintain the additional works needed to utilize irrigation storage as well as contract for the storage space. When the project costs allocated to irrigation exceeds the estimated amount that can be repaid to the United States by the water users, in accordance with reclamation law, the amount of the excess will be stated and appropriate reference made to the fact that special authorization by Congress is required. Section 8 was amended by Section 931 of the Water Resources Development Act of 1986 (WRDA '86).

1986 Amendment

Section 931 of WRDA '86 (Public Law 99-662) amends Section 8 of the 1944 Flood Control Act to authorize the Secretary of the Army to allocate water which was allocated in projects operated by the Corps for M&I water supply, and which is not under a repayment agreement, for the interim use for irrigation purposes.

1958 RIVER AND HARBOR ACT

Title III, 1958 River and Harbor Act

Title III of the 1958 River and Harbor Act (Public Law 85-500) is entitled the "Water Supply Act of 1958." Section 301(a), established a policy of cooperation in development of water supplies for domestic, municipal, industrial, and other purposes.

Section 301(b) is the authority for the Corps to include municipal and industrial (M&I) water storage in reservoir projects and to reallocate storage in existing projects to M&I water supply. However, as specified in Section 301 (d), modifications to a planned or existing reservoir project to add water supply which would seriously affect the project, its other purposes, or its operation, requires congressional authorization. This act was amended by Section 10 of Public Law 87-88 and by Section 932 of Public Law 99-662.

Section 10, Federal Water Pollution Control Act Amendments of 1961

Section 10 of this 1961 act (Public Law 87-88) modified the 1958 Water Supply Act to accept assurances for the use of future water supply as a means of accommodating the construction cost payments for future water supply.

Section 932, 1986 Water Resources Development Act

Section 932 of WRDA '86, (Public Law 99-662), amends the Water Supply Act of 1958, as amended, for Corps projects but not for Bureau of Reclamation projects, by eliminating the 10-year interest free period for future water supply, modifying the interest rate formula, limiting repayment to 30 years, and requiring annual operation, maintenance and replacement costs to be reimbursed on an annual basis.

PUBLIC LAW 88-140

This act, approved 16 October 1963, extended to the non-Federal sponsor of water supply storage the right to use the storage for the physical life of the project subject to repayment of costs. This removed an uncertainty as to the continued availability of the storage space after the 50-year maximum period previously allowed in contracts.

SECTION 322, 1990 WATER RESOURCES DEVELOPMENT ACT

Section 322 of the Water Resources Development Act of 1990 (WRDA '90) (Public Law 101-640) allows the Secretary of the Army to provide M&I water supply in Corps operated reservoirs to low-income communities at a price which is the greater of (1) benefits foregone or (2) the updated cost of storage but not to exceed (for fiscal year 1991) \$100 per acre-foot of storage space. This pricing policy may result in a lower cost to communities than current pricing policies in certain situations. The amount of storage which can be made available to any one community under this provision is the amount required in any reservoir to yield two million gallons of water per day. Contract price and eligibility requirements are set at the time of contract signing and are to be based on data current at the time

PROCEDURES FOR OBTAINING WATER FROM CORPS PROJECTS

A very superficial description of procedures for obtaining water from Corps projects is provided below. With possibly an exception during emergency/disaster situations, all water supply withdrawals from Corps lakes are governed by contracts and reimbursement for the storage space is required. Further information will be furnished on any of these scenarios at the request of a non-Federal entity. Also, a Water Supply Handbook is being prepared by the Institute for Water Resources, Water Resources Support Center, Army Corps of Engineers. This handbook is to be a comprehensive desk reference for use by the Corps of Engineers, academic, and non-Federal entities interested in water supply planning and management. The handbook should be available later this year.

TEMPORARY WATER DURING DROUGHTS

There are several provisions under this heading to provide temporary water during disasters and major droughts. The one most appropriate to this study is that short term releases for water supply during drought emergencies can be provided if the reservoir in question has surplus or excess storage. Request for such releases should be initiated by the local community through the proper state office for their coordination with the Corps. These releases can be authorized on the local level by the District of Engineers. They are for temporary emergencies and are not to be construed as an alternative to obtaining an adequate, safe source for the community.

SURPLUS WATER

Surplus water is defined as water stored in a Corps lake that is not required because the authorized need for the water never developed or the need has been reduced by changes which have occurred since authorization. Agreements covering surplus water will normally be for small amounts of water and for temporary use as opposed to storage reallocations and a permanent right to that storage. Surplus water agreements will be limited to a 5-year period. Use of the Section 6 authority is allowed only where non-Federal sponsors do not want to purchase storage because: use of the water is desired for a short term only; or use would be temporary pending development of the authorized use and reallocation of storage is not appropriate. To obtain authorization for use of surplus water, a brief report must be submitted for Washington level approval.

REALLOCATION OF STORAGE UP TO 499 ACRE-FEET

Provided that this reallocation of storage doesn't significantly impact authorized purposes, it can be requested by a brief letter report and the Division Commander can approve.

REALLOCATION OF INTERMEDIATE STORAGE SPACE

If the reallocation of storage from authorized purposes to water supply purposes does not cause significant impacts to the authorized purposes, then a report supporting this conclusion can be approved by the Commander, U.S. Army Corps of Engineers. At Carr Creek Lake, it is estimated that up to about 5,600 acre-feet could be reallocated without significant impacts to project purposes. This conclusion would require further review and approval prior to its implementation.

REALLOCATION OF SIGNIFICANT STORAGE SPACE

This is defined as reallocation storage from authorized purposes to water supply purposes, and which would cause significant impacts to the authorized purposes. Studies to accomplish this would normally consist of a reconnaissance report at Federal expense and then a cost shared (50% non-Federal) feasibility study to support the recommendations. This change in project purposes would require Congressional approval.

APPLICABILITY OF LEGISLATION TO POTENTIAL WATER DEMANDS OF STUDY AREA

Most of previous information in this report was directed at providing water supply storage for a new regional treatment plant. When the seven current water service districts are considered separately, the range of future water demands (peak daily demands) vary from about 100,000 gallons per day (0.1 MGD) for Caney Creek to about 4.5 MGD for the Hazard-Vicco system. To provide information more appropriate for these ranges, Table 27 presents storage space, corresponding water yields, cost data and level of authorization required for approval. Also, footnoted is the cost of storage up to 2 MGD if Section 322 of the Water Resources Development Act of 1990 is applicable. Applicability is determined by the Assistant Secretary of the Army for Civil Works.

TABLE 27
CARR CREEK LAKE
WITHDRAWAL RATES AND COSTS

Direct Withdrawal (Rounded)	Usable Storage Space 'Acre-Feet'	Cost		Reporting ² and Approval Requirements
		Storage Space	Annual O & M	
0.5 MGD	499	\$2,125,000 (\$59,381) ¹	\$12,600	Brief Letter Report Division Commander
1 MGD	1800	\$7,670,000 (\$214,200) ¹	\$45,500	Brief Letter Report Commander, US Army Corps of Engineers
1.5 MGD	3000	\$12,780,000	\$75,800	Brief Letter Report Commander, US Army Corps of Engineers
5 MGD ³	5600	\$23,840,000	\$141,000	Brief Letter Report Commander, US Army Corps of Engineers
Greater than 6.5 MGD		---	---	Cost Shared Feasibility Report Congressional Approval

If Section 322 of WRDA 1990 was applicable, the storage space cost would be computed at \$119 per acre-foot for storage to furnish up to 2 MGD. Full O & M charges shown above would be required of the user.

Source of data ER 1105-2-100

If no significant impacts to authorized purposes

FEDERAL INTEREST IN WATER SUPPLY INFRASTRUCTURE

Section 531 of the Water Resources Development Act of 1996 established the authority for the Secretary of the Army to establish a program for providing assistance to non-Federal interests in southern and eastern Kentucky (which includes Knott, Letcher, and Perry Counties). Assistance under this section may be in the form of design and construction assistance for water related environmental infrastructure and resource protection and development projects in southern and eastern Kentucky, including projects for wastewater treatment and related facilities, water supply and related facilities, and surface water resource protection and development.

Before providing assistance under this section, the Secretary shall enter into a project cooperation agreement with a non-Federal interest to provide for design and construction of the project to be carried out with such assistance. The project cooperation agreement shall provide for the following requirements (from Section 531):

Plan

Development by the Secretary, in consultation with appropriate Federal and State officials, of a facilities development plan or resource protection plan, including appropriate plans and specifications.

Legal and Institutional Structures

Establishment of such legal and institutional structures as are necessary to ensure the effective long-term operation of the project by the non-Federal interest.

Cost Sharing

In General

Total project costs under each agreement entered into under this subsection shall be shared at 75 percent Federal and 25 percent non-Federal. The Federal share may be in the form of grants or reimbursements of project costs.

Credit for Design Work

The non-Federal interest shall receive credit for the reasonable costs of design work completed by such interest before entering into the agreement with the Secretary.

Credit for Certain Financing Costs

In the event of a delay in the reimbursement of the non-Federal share of a project, the non-Federal interest shall receive credit for reasonable interest and other associated financing costs necessary for such non-Federal interest to provide the non-Federal share of the project's cost.

Lands, Easements, and Rights-of-Way

The non-Federal interest shall receive credit for lands, easements, rights-of-way, and relocations provided by the non-Federal interest toward its share of project costs (including costs associated with obtaining permits necessary for the placement of such project on publicly owned or controlled lands), but not to exceed 25 percent of total project costs.

Operation and Maintenance

The non-Federal share of operation and maintenance costs for projects constructed under an agreement entered into under this sub-section shall be 100 percent.