CASE NUMBER:

99-003

INDEX FOR CASE: 99-003
KIRKSVILLE WATER ASSOCIATION, INC.
Construct, Finance; 278.023
CUZICK WATER EXTENSION

IN THE MATTER OF THE APPLICATION OF KIRKSVILLE WATER ASSOCIATION, INC., FOR CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY, CUZICK WATER EXTENSION

SEQ NBR	ENTRY DATE	REMARKS
0001	01/04/99	Application.
0002	01/13/99	Acknowledgement letter.
0003	01/13/99	No def. letter
0004	01/28/99	FINAL ORDER; GRANTS CONSRUCTION AND ACCEPTS PROPOSED PLAN OF FINANCING

COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION
730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

CERTIFICATE OF SERVICE

RE: Case No. 99-003
KIRKSVILLE WATER ASSOCIATION, INC.

I, Stephanie Bell, Secretary of the Public Service Commission, hereby certify that the enclosed attested copy of the Commission's Order in the above case was served upon the following by U.S. Mail on January 28, 1999.

Parties of Record:

Alice C. Edwards
Bookkeeper
Kirksville Water Association, Inc.
P. O. Box 670
155 N. Keeneland
Richmond, KY. 40476 0670

Honorable C. Michael Weldon
Attorney at Law
Burnam, Thompson, Weldon,
Simons and Dunlap, P.S.C.
Bank One Building, Suite 2A
116 West Main Street
Richmond, KY. 40476 0726

Stephanie D. Bell
Secretary of the Commission

SB/sa
Enclosure

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF KIRKSVILLE WATER ASSOCIATION, INC. FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY, CUZICK WATER EXTENSION	))))	CASE NO. 99-003

O R D E R

On January 4, 1999, Kirksville Water Association, Inc. ("Kirksville Water") submitted an application for a Certificate of Public Convenience and Necessity to construct a $442,500 waterworks improvement project and for approval of its plan of financing for this project. This project will provide service to 74 additional customers. Project funding is a $102,300 bond issue to be purchased pursuant to an agreement with the U.S. Department of Agriculture's Rural Development ("RD"), a $306,900 grant from the RD and a $33,300 contribution from the Applicant.

Kirksville Water's application was made pursuant to KRS 278.023, which requires the Commission to accept agreements between water utilities and the U.S. Department of Agriculture or the U.S. Department of Housing and Urban Development and to issue the necessary orders to implement the terms of such agreements within 30 days of satisfactory completion of the minimum filing requirements. Given that minimum filing requirements were met in this case on January 4, 1999, KRS 278.023 does not grant the Commission any discretionary authority to modify or reject any portion of this agreement.

IT IS THEREFORE ORDERED that:

1. Kirksville Water is hereby granted a Certificate of Public Convenience and Necessity for the proposed construction project.

2. Kirksville Water's proposed plan of financing with RD is accepted.

3. Kirksville Water is authorized to issue bonds not to exceed $102,300.

4. Kirksville Water shall file a copy of the "as-built" drawings and a certified statement that the construction has been satisfactorily completed in accordance with the contract plans and specifications within 60 days of the substantial completion of the construction certificated herein.

5. Kirksville Water shall monitor the adequacies of the expanded water distribution system after construction. If the level of service is inadequate or declining or the pressure to any customer falls outside the requirements of 807 KAR 5:066, Section 5(1), Kirksville Water shall take immediate action to bring the system into compliance with Commission regulations.

Nothing contained herein shall be deemed a warranty of the Commonwealth of Kentucky, or any agency thereof, of the financing herein accepted.

Done at Frankfort, Kentucky, this 28th day of January, 1999.

By the Commission

ATTEST:

Executive Director

COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION
730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

January 13, 1999

Alice C. Edwards
Bookkeeper
Kirksville Water Association, Inc.
P. O. Box 670
155 N. Keeneland
Richmond, KY. 40476 0670

Honorable C. Michael Weldon
Attorney at Law
Burnam, Thompson, Weldon,
Simons and Dunlap, P.S.C.
Bank One Building, Suite 2A
116 West Main Street
Richmond, KY. 40476 0726

RE: Case No. 99-003
KIRKSVILLE WATER ASSOCIATION, INC.
(Construct, Finance; 278.023) CUZICK WATER EXTENSION

This letter is to acknowledge receipt of initial application in the above case. The application was date-stamped received January 4, 1999 and has been assigned Case No. 99-003. In all future correspondence or filings in connection with this case, please reference the above case number.

If you need further assistance, please contact my staff at 502/564-3940.

Sincerely,

Stephanie Bell
Secretary of the Commission

SB/jc

COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION
730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

January 13, 1999

Alice C. Edwards
Bookkeeper
Kirksville Water Association, Inc.
P. O. Box 670
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Honorable C. Michael Weldon
Attorney at Law
Burnam, Thompson, Weldon,
Simons and Dunlap, P.S.C.
Bank One Building, Suite 2A
116 West Main Street
Richmond, KY. 40476 0726

RE: Case No. 99-003
KIRKSVILLE WATER ASSOCIATION, INC.

The Commission staff has reviewed your application in the above case and finds that it meets the minimum filing requirements. Enclosed please find a stamped filed copy of the first page of your filing. This case has been docketed and will be processed as expeditiously as possible.

If you need further assistance, please contact my staff at 502/564-3940.

Sincerely,

Stephanie Bell

Stephanie Bell
Secretary of the Commission

SB/sa
Enclosure

99-00006

BURNAM, THOMPSON, WELDON, SIMONS AND DUNLAP, P.S.C.
ATTORNEYS AT LAW

A.R. Burnam III
(1921 - 1998)

James E. Thompson
C. Michael Weldon
Daniel A. Simons
Whitney Dunlap III

BANK ONE BUILDING, SUITE 2A
116 WEST MAIN STREET
P.O. BOX 726
RICHMOND, KENTUCKY 40476-0726

Phone: (606) 623-5205
FAX: (606) 623-7394

December 30, 1998

JAN 04 1999

FILED
JAN 04 1999
PUBLIC SERVICE COMMISSION

Ms. Helen C. Helton
Executive Director
Kentucky Public Service Commission
730 Schenkel Lane
P. O. Box 615
Frankfort, KY 40602

Re: Kirksville Water Association, Inc.
Application Pursuant to KRS 278.023; 807 KAR 5:
Cuzick Extension

Case No. 99-003

Dear Ms. Helton:

Enclosed is an original and 10 copies of our Application for a Certificate of Public Convenience and Necessity, pursuant to KRS 278.023 and 807 KAR 5.

Would you please clock in and return the extra copy of the Application (without exhibits) which is stapled to this cover letter?

Thank you for your assistance and please advise if anything additional is necessary for our filing to meet the Commission's minimum filing requirements.

Very truly yours,

BURNAM, THOMPSON, WELDON,
SIMONS AND DUNLAP, P.S.C.

C. Michael Weldon

CMW:cq
5986
Enclosures
cc: KWA
CMW, Inc.

99-00006

BURNAM, THOMPSON, WELDON, SIMONS AND DUNLAP, P.S.C.
ATTORNEYS AT LAW

A.R. Burnam III
(1921 - 1998)

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Case No. 99-003

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BURNAM, THOMPSON, WELDON,
SIMONS AND DUNLAP, P.S.C.

C. Michael Weldon

CMW:cq
5986
Enclosures
cc: KWA
CMW, Inc.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

99-003

IN RE:)
)
APPLICATION OF KIRKSVILLE WATER)
ASSOCIATION, INC., FOR CERTIFICATE)
OF PUBLIC CONVENIENCE AND NECESSITY,)
CUZICK WATER EXTENSION)

CASE NO. [illegible]

JAN 04 1999

PUBLIC SERVICE COMMISSION

Comes Applicant, Kirksville Water Association, Inc., by its President and its legal counsel, and hereby requests issuance by the Public Service Commission of a Certificate of Public Convenience and Necessity for the purpose of extending its water lines to the Cuzick community in Madison County, Kentucky. The proposed extension will immediately serve approximately seventy-four (74) new customers and expand the total number of the Association's customers to approximately 1,336.

Pursuant to applicable statutes and regulations, the following information, documentation and engineering data is submitted herewith.

1. Kirksville Water Association, Inc., P. O. Box 670, 155 North Keeneland, Richmond, Kentucky 40475, and this Application is submitted pursuant to KRS 278.023; 807 KAR 5:001, Section 8; and 807 KAR 5:069. for review and advice by the Public Service Commission as the project has previously been approved for Federal funding by the U. S. Department of Agriculture, Rural Development.

2. Applicant is a corporation and a certified copy of its Article of Incorporation have been previously filed with the Public Service Commission in Case Number 89-222, In Re: The Application of Kirksville Water Association, Inc. for Order Approving Construction Financing, Certificates of Public Convenience and Necessity, and Interest Rates.

3. Pursuant to 807 KAR 5:069, Section 1, attached as exhibits hereto are the following documents:

Exhibit A: Copy of USDA Letter of Conditions, dated November 25, 1997;

Exhibit B: Copy of FmHA Letter of Concurrence in Bid Award, dated 12/28/98;

Exhibit C: Copy of Preliminary Engineering Reports;

Exhibit D: Copy of Final Engineering Reports;

Exhibit E: Certified Statement from the Corporation's President, Otis Bundy, of compliance with minimum construction and operating requirements, that all other state approvals and permits have been obtained, that no rate change will be requested and the dates on which construction will begin and end.

4. Applicant does not propose herein, nor does it believe that a future proposal will be necessary, for a revision of its rates. The construction which is the subject of this Application will be finance by a loan, in the amount of $102,300.00, and a grant, in the amount of $306,900.00, from the Farmers Home Administration, combined with funds from Applicant in the amount of $33,300.00, which latter amount is anticipated to be received from the connection fees paid by the seventy-four (74) new customers to be served by the extension of Applicant's service lines.

5. Construction on the proposed project is scheduled to begin on March 1, 1999, and construction is scheduled to end on or before August 30, 1999.

6. Notice to Applicant's customers is not necessary, pursuant to 807 KAR Section 1(6), as no new rates will be requested as a result of this project.

Wherefore, Applicant hereby requests the Public Service Commission to issue its Certificate of Public Convenience and Necessity to Applicant for the within described construction projection.

BURNAM, THOMPSON, WELDON,
SIMONS AND DUNLAP, P.S.C.
Bank One Building
116 West Main Street, Suite 2A
P. O. Box 726
Richmond, KY 40476-0726
(606) 623-5205; Fax (606) 623-7394

By: _____
C. Michael Weldon

_____
Otis Bundy, President,
Kirksville Water Association, Inc.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN RE:)
)
APPLICATION OF KIRKSVILLE WATER)
ASSOCIATION, INC., FOR CERTIFICATE)
OF PUBLIC CONVENIENCE AND NECESSITY,)
CUZICK WATER EXTENSION)

CASE NO. 97-003

Comes Applicant, Kirksville Water Association, Inc., by its President and its legal counsel, and hereby requests issuance by the Public Service Commission of a Certificate of Public Convenience and Necessity for the purpose of extending its water lines to the Cuzick community in Madison County, Kentucky. The proposed extension will immediately serve approximately seventy-four (74) new customers and expand the total number of the Association's customers to approximately 1,336.

Pursuant to applicable statutes and regulations, the following information, documentation and engineering data is submitted herewith.

1. Kirksville Water Association, Inc., P. O. Box 670, 155 North Keeneland, Richmond, Kentucky 40475, and this Application is submitted pursuant to KRS 278.023; 807 KAR 5:001, Section 8; and 807 KAR 5:069, for review and advice by the Public Service Commission as the project has previously been approved for Federal funding by the U. S. Department of Agriculture, Rural Development.

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Wherefore, Applicant hereby requests the Public Service Commission to issue its Certificate of Public Convenience and Necessity to Applicant for the within described construction projection.

BURNAM, THOMPSON, WELDON,
SIMONS AND DUNLAP, P.S.C.
Bank One Building
116 West Main Street, Suite 2A
P. O. Box 726
Richmond, KY 40476-0726
(606) 623-5205; Fax (606) 623-7394

By: _____
C. Michael Weldon

_____
Otis Bundy, President,
Kirksville Water Association, Inc.

USDA United States Department of Agriculture

Rural Development

771 Corporate Drive, Suite 200
Lexington, KY 40503-5477
(606) 224-7336 TTY(606) 224-7422

NOV 25 1997

November 25, 1997

Mr. Otis Bundy, President
Kirksville Water Association, Inc.
Richmond, Kentucky 40476

Dear Mr. Bundy:

This letter establishes conditions which must be understood and agreed to by you before further consideration may be given to the application. The (loan and/or grant) will be administered on behalf of the Rural Utilities Service (RUS) by the State and Area office staff of USDA, Rural Development. Any changes in project cost, source of funds, scope of services or any other significant changes in the project or applicant must be reported to and approved by USDA, Rural Development, by written amendment to this letter. Any changes not approved by Rural Development shall be cause for discontinuing processing of the application. It should also be understood that Rural Development is under no obligation to provide additional funds to meet an overrun in construction costs.

This letter is not to be considered as loan or grant approval or as a representation as to the availability of funds. The docket may be completed on the basis of a RUS loan not to exceed $102,300 and a RUS grant not to exceed $306,900.

If Rural Development makes the loan, you may make a written request that the interest rate be the lower of the rate in effect at the time of loan approval or the time of loan closing. If you do not request the lower of the two interest rates, the interest rate charged will be the rate in effect at the time of loan approval. The loan will be considered approved on the date a signed copy of Form RD 1940-1, "Request for Obligation of Funds," is mailed to you. If you want the lower of the two rates, your written request should be submitted to Rural Development as soon as practical. In order to avoid possible delays in loan closing, such a request should ordinarily be submitted at least 30 days before loan closing.

Please complete and return the attached Form RD 1942-46, "Letter of Intent to Meet Conditions," if you desire that further consideration be given to your application.

EXHIBIT A

The "Letter of Intent to Meet Conditions" must be executed within three weeks from the date of this letter or it becomes invalid unless a time extension is granted by Rural Development.

If the conditions set forth in this letter are not met within 240 days from the date hereof, Rural Development reserves the right to discontinue the processing of the application.

In signing Form RD 1942-46, you are agreeing to complete the following as expeditiously as possible:

1. Number of Users and Their Contribution:

There shall be 1,336 water users, of which 1,262 are existing users and 74 are new users contributing $33,300 in connection fees toward the cost of the project. The connection fees will be collected prior to advertising for construction bids and will be placed in the construction account at loan pre-closing, unless spent for authorized purposes prior to loan pre-closing. The Rural Development Manager will review and authenticate the number of users and amount of connection fees prior to advertising for construction bids.

1a. Grant Agreement:

Attached is a copy of RUS Bulletin 1780-12, "Water and Waste System Grant Agreement," for your review. You will be required to execute a completed form at the time of grant closing.

1b. Drug-Free Work Place:

Prior to grant approval, the Association will be required to execute Form AD-1049, "Certification Regarding Drug-Free Workplace Requirements (Grants) Alternative I - For Grantees Other Than Individuals."

2. Repayment Period:

The loan will be scheduled for repayment over a period not to exceed 40 years from the date of the Promissory Note. Principal payment will not be deferred for a period in excess of two (2) years from the date of the Promissory Note. The Association will be required to adopt a supplemental payment agreement providing for monthly payments of principal and interest so long as the Promissory Note is held or insured by RUS.

Rural Development encourages the use of the Preauthorized Debit (PAD) payment process, which authorizes the electronic withdrawal of funds from your bank account on the exact installment payment due date (contact the Rural Development Manager for further information).

3. Funded Depreciation Reserve Account:

The Association will be required to deposit $50.00 per month into a "Funded Depreciation Reserve Account". The per month deposits are for the life of the loan.

The required deposits to the Reserve Account are in addition to the requirements of the Association's prior note resolutions.

The annual deposit to the Reserve Account is required to commence the first full fiscal year after the facility becomes operational.

4. Security Requirements:

The loan will be secured by a real estate mortgage, a financing statement, and pledge of gross water revenue, in the Loan Resolution and Financing Statement.

5. Land Rights and Real Property:

The Association will be required to furnish satisfactory title, easements, etc., necessary to install, maintain and operate the facility to serve the intended users. The pipelines will be on private rights-of-way where feasible. Easements and options are to be secured prior to advertising for construction bids.

6. Organization:

The Association will be legally organized under applicable KRS which will permit them to perform this service, borrow and repay money.

7. Business Operations:

The Association will be required to operate the system under a well-established set of resolutions, rules and regulations. A budget must be established annually and adopted by the Association after review by Rural Development. At no later than loan pre-closing, the Association will be required to furnish a prior approved management plan to include, as a minimum, provisions for management, maintenance, meter reading, miscellaneous services, billing, collecting, bookkeeping, making and delivering required reports and audits.

8. Accounts, Records and Audits:

The Association will be required to maintain adequate records and accounts and submit annual budgets and year-end reports (annual audits) in accordance with 1780.47 of RUS Instruction 1780 and RUS Staff Instruction 1780-4, a copy of which is enclosed.

9. Accomplish Audits for Years in Which Federal Financial Assistance is Received:

The Association will accomplish audits in accordance with OMB Circular A-133, during the years in which federal funds are received. The Association will provide copies of the audits to the Area Office and the appropriate Federal cognizant agency as designated by OMB Circular A-133.

10. Insurance and Bonding:

The following insurance and bonding will be required:

A. Adequate Liability and Property Damage Insurance including vehicular coverage, if applicable, must be obtained and maintained by the Association. The Association should obtain amounts of coverage as recommended by its attorney, consulting engineer and/or insurance provider.

B. Worker's Compensation - The Association will carry worker's compensation insurance for employees in accordance with applicable state laws.

C. Fidelity Bond - The Association will provide Fidelity Bond Coverage for all persons who have access to funds. Coverage may be provided either for all individual positions or persons, or through "blanket" coverage providing protection for all appropriate employees and/or officials. The amount of coverage required for all RUS loans is $74,000.

D. Real Property Insurance - The Association will obtain and maintain adequate fire and extended coverage on all structures including major items of equipment or machinery located in the structures. The amounts of coverage should be based on recommendations obtained by the Association from its attorney, consulting engineer and/or insurance provider. Subsurface lift stations do not have to be covered except for the value of electrical and pumping equipment therein.

E. Flood Insurance - The Association will obtain and maintain adequate coverage on any facilities located in a special flood and mudslide prone areas.

11. Planning and Performing Development:

A. The engineer should not be authorized to commence work on final plans and specifications until a determination has been made that the project can be planned and constructed within the estimated cost shown in paragraph "20" of this letter. The engineer may then proceed to develop final plans and specifications to be completed no later than 210 days from this date, and prepare bid documents. The Rural Development Manager is prepared to furnish the necessary guide for him to follow so as to keep the project plans and documents within our guidelines and requirements. The project should not be advertised for construction bids until all easements and enforceable options have been obtained, and total funds are committed or available for the project.

B. The following documents will be submitted to Rural Development for review and must be concurred in by Rural Development prior to advertisement for construction bids:

1. Final plans, specifications and bid documents.
2. Applicant's letter on efforts to encourage efforts to encourage small business and minority-owned business participation.
3. Legal Service Agreements.
4. Engineering Agreements.

Revision in these documents will be subject to Rural Development concurrence. Any agreements, contracts, etc. not reviewed and approved by Rural Development will not be eligible for payment from project funds or revenues from facilities financed by this Agency.

12. Compliance with Section 504 of the Rehabilitation Act of 1973:

The Association will be required to comply with Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), in order to make sure no handicapped individual, solely by reason of their handicap, is excluded from participation in the use of the water system, be denied the benefits of the water system, or be subjected to discrimination.

13. Closing Instructions:

The Office of General Counsel, our Regional Attorney, will be required to write closing instructions in connection with this loan. Conditions listed therein must be met by the Association.

14. Compliance with Special Laws and Regulations:

The Association will be required to conform with any and all state and local laws and regulations affecting this type project.

15. System Operator:

The Association is reminded that the system operator must have an Operator's Certificate issued by the State.

16. Prior to Pre-Closing the Loan, the Association will be Required to Adopt:

A. Form RD 1942-8, "Resolution of Members or Stockholders."

B. Form RD 1942-9, "Association Loan Resolution."

C. Form RD 400-1, "Equal Opportunity Agreement."

D. Form RD 400-4, "Assurance Agreement."

E. Form AD-1047, "Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transaction."

F. Form RD 1910-11, "Applicant Certification Federal Collection Policies for Consumer or Commercial Debts."

G. FmHA Instruction 1940-Q, Exhibit A-1, "Certification for Contracts, Grants and Loans."

The Association must offer the opportunity for all residents in the service area to become users of the facilities regardless of race, creed, color, religion, sex, national origin, marital status, physical or mental handicap or level of income.

17. Refinancing and Graduation Requirements:

The Association is reminded that if at any time it shall appear to the Government that the Association is able to refinance the amount of the RUS indebtedness then outstanding, in whole or in part, by obtaining a loan from commercial sources at reasonable rates and terms, upon the request of the Government, the Association will apply for and accept such loan in sufficient amount to repay the Government.

18. Commercial Interim Financing:

The Association will be required to use commercial interim financing for the project during construction for the RUS loan portion of the financing, if available at reasonable rates and terms.

Before the loan is closed, the Association will be required to provide Rural Development with statements from the contractor, engineer and attorneys that they have been paid to date in accordance with their contract or other agreements and, in the case of the contractor, that he has paid his suppliers and sub-contractors.

19. Disbursement of Project Funds:

A construction account for the purpose of disbursement of project funds (RUS) will be established by the Association prior to start of construction. The position of officials entrusted with the receipt and disbursement of RUS project funds will be covered by a "Fidelity Bond," with USDA-Rural Development as Co-Obligee, in the amount of construction funds on hand at any one time during the construction phase.

During construction, the Association shall disburse project funds in a manner consistent with subsection 1780.76 (e) of RUS Instruction 1780. Form RD 1924-18, "Partial Payment Estimate," or similar form approved by Rural Development, shall be used for the purpose of documenting periodic construction estimates, and shall be submitted to Rural Development for review and acceptance. Prior to disbursement of funds by the Association, the Board of Directors shall review and approve each payment estimate. All bills and vouchers must be approved by Rural Development prior to payment by the Association

Form RD 440-11, "Estimate of Funds Needed for 30-Day Period Commencing _____," will be prepared by the Association and submitted to Rural Development in order that a periodic advance of federal cash may be requested.

Monthly audits of the Association's construction account records shall be made by Rural Development.

20. Cost of Facility:

Breakdown of Costs:

Development		$ 335,500
Land and Rights		500
Legal and Administrative		6,000
Engineering		69,000
Interest		8,000
Contingencies		23,500
	TOTAL	$ 442,500

Financing:

RUS Loan		$ 102,300
RUS Grant		306,900
Applicant Contribution		33,300
	TOTAL	$ 442,500

21. Use of Remaining Project Funds:

The applicant contribution shall be considered as the first funds expended. After providing for all authorized costs, any remaining RUS project funds will be considered to be RUS grant funds and refunded to RUS. If the amount of unused RUS grant funds exceeds the RUS grant, that part would be RUS loan funds.

22. Rates and Charges:

Rates and charges for facilities and services rendered by the Association must be at least adequate to meet cost of maintaining, repairing and operating the water system and meeting required principal and interest payments and the required deposits to debt service and/or depreciation reserve.

Water rates will be at least:

First	2,000 gallons @ $11.62	- Minimum Bill.
Next	3,000 gallons @ $ 5.56	- per 1,000 gallons.
Next	5,000 gallons @ $ 4.51	- per 1,000 gallons.
All Over	10,000 gallons @ $ 3.51	- per 1,000 gallons.

23. Water Purchase Contract:

The Association will submit a Water Purchase Contract for approval by Rural Development before advertising for construction bids. If the contract is not on Form RD 442-30, "Water Purchase Contract," the contract will require approval by our Regional Attorney. The contract must meet the requirements of subsection 1780.62 of RUS Instruction
1780.

24. Floodplain Construction:

The Association will be required to pass and adopt a Resolution or amend its By-Laws whereby the Association will deny any water service to any future customer wishing to build on or develop property located within a designated floodplain. If a customer or developer requests service for construction in a designated floodplain, the customer or developer must provide evidence and a justification for approval by the Association and Rural Development officials that there are no other alternatives to construction or development within the designated floodplain. The community must be a participant in the National Flood Insurance Program (NFIP) and the customer or developer must obtain the required permits prior to the tap on restrictions being waived.

25. Final Approval Conditions:

Final approval of this loan will depend on your willingness, with the assistance of all your co-workers, to meet the conditions of this letter in an orderly and systematic manner. Then too, final approval will depend on funds being available.

If you desire to proceed with your application, the Rural Development Manager will allot a reasonable portion of his time to provide guidance in application processing.

Sincerely,

THOMAS G. FERN
State Director
Rural Development

Enclosures

cc: Rural Development Manager - London, KY
Community Development Manager - Richmond, KY
Bluegrass ADD - Lexington, KY
James E. Thompson - Richmond, KY
CMW, Inc. - Richmond, KY
PSC - ATTN: Claude Rhorer - Frankfort, KY

USDA United States Department of Agriculture

Rural Development

771 Corporate Drive, Suite 200
Lexington, KY 40503-5477
(606) 224-7336 TTY(606) 224-7422

December 28, 1998

SUBJECT: Kirksville Water Association - Cuzick Water Line Extension
Concurrence in Contract Award

TO: Rural Development Manager
London, Kentucky

Based on the bids received and the recommendation of the consulting engineer, Rural Development concurs in the award of the subject contract to the low bidder, D&H Contracting Company, Inc., in the amount of $218,019.30.

Jane Hunter Brown

for THOMAS G. FERN
State Director
Rural Development

cc: ✓CMW, Inc.
Richmond, Kentucky

EXHIBIT B

CMW

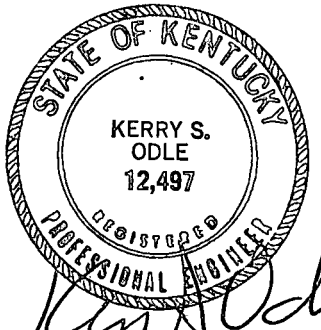
PRELIMINARY ENGINEERING REPORT

Cuzick Extension

Kirksville Water Association

BY
CMW, Inc.
136 Big Hill Avenue
Richmond, KY

June, 1997



PROJECT MANUAL

SET NO.

12/15/98

EXHIBIT C

Table of Contents

I. General

The Kirksville Water Association, which currently serves 1262 customers in Madison County, Kentucky, was approached by residents in the Cuzick Community on the possibility of serving Cuzick with potable water. The water board directed their engineer to perform a feasibility study in which a copy is attached in Exhibit III. This feasibility study showed that the Cuzick area would be a viable area to serve if grant money was available and the water board voted to have their engineer submit a pre-application to Rural Development for a loan and grant.

II. Project Planning Area

A. Location

The area to be included by the proposed project is in the northwestern part of Madison County approximately thirteen miles west of Richmond, Kentucky, and consists of the community of Cuzick and surrounding areas. The community of Cuzick is 3.4 miles from the Kirksville Water Association water main on Long Branch Road.

Included in Exhibit I is portion of a USGS map showing the proposed location of this project and in Exhibit II is photographs of areas which will be served in this project.

B. Environmental Resources Permit

Exhibit II - "Request for Environmental Information" has the environmental information which was considered in developing this project. (This has previously been sent to Rural Development)

C. Growth Areas and Population Trends

Growth in this area has been limited because of lack of potable water and distance from Richmond. With the availabilitly of potable water and the continued growth of Madison County, growth should increase as farms are subdivided and family members build in the area. There will be a limited amount of growth due to narrow roads in the area.

III. Existing Facilities

A. Location Map

A location map for this project is included in Exhibit I.

B. History

The Kirksville Water Association began operation in November, 1976 at the start of a construction contract in which most of their system was constructed. The Kirksville Water Association was organized to serve rural customers in Madison County in the area bordered by I-75, Garrard County, Kentucky River

and Tates Creek. As a result of the increased population of Richmond area the customer base continued to increase. In 1989 the Water Association expanded to serve the Newby area. The Water Association currently serves 1262 customers.

C. Condition of Facilities

The facilities for the Kirksville Water Association is in good condition. In 1989 a pump station was replaced and a new pump station added along with a telemetry system. The elevated water storage tank which was constructed in 1976 was painted in 1991 with the other elevated water storage tank being constructed in 1989. A new tak in the Caleast area is currently in the planning stages.

Kirksville Water Association purchases their water from the Richmond Water, Gas and Sewerage. The contract is for an average maximum of 6,000,000 gallons per month. Kirksville Water Association exceeds the maximum monthly usage on certain high use months. Kirksville Water Association is currently talking with their suplier (Richmond Utilities) on increasing the maximum usage. In the new contract, the Cuzick project will be considered for their water needs.

Kirksville Water Association complies with the Safe Drinking Wate Act and all applicable state requirements.

D. Financial Status of any Operating Central Facilities

The current rate schedule is shown in Exhibit IV and information regarding annual operating and maintenance cost and customer usage is included in Exhibit I.

The revenues received for the last three fiscal years are $390,125 (1996); $382,738 (1995) and $360,414 (1994). The Water Association currently has three outstanding FmHA loans which total $925,502 and they are required to keep $50,000 in reserve accounts for these loans.

IV. Need for Project

A. Health and Safety

Currently the residents of Cuzick are using cisterns and wells for their water needs. In Exhibit V is a letter from the Environmental Supervision of the Madison County Health Department addressing the condition of the water being used by the Cuzick residents. If needed water samples can be taken to show the conditions of the water.

B. System O & M

The distribution system of the Kirksville Water Association is in good shape with all pumps being installed in 1989 and all tanks painted after 1989. The Association has an average

monthly water loss of 12% which is due to normal flushing and maintenance of lines. The addition of this project will cause no problems to the system.

C. Growth

The Cuzick area to be served by this project will have a minimum of 74 customers. There are approximately 85 existing residents in the area with the potential for twice the amount due to the amount of farm land which could be subdivided.

V. Alternatives Considered

A. Description

Cuzick lies approximately 2.5 miles west of a water main on Tates Creek Road in the White Hall Water District. The White Hall water line on Tates Creek does not have enough pressure to serve the Cuzick area. To serve the area, a water line would have to be run prior to the pressure reducing valve for an additional .8 mile. This line would have to be ductile iron and pressure would be higher in the Tates Creek area. The remainder of the project would be similar to Kirksville project. Cuzick is outside the boundaries of the White Hall Water District.

B. Design Criteria

The design parameters for the considered alternate with White Hall Water District were the same as was considered in the proposed project with Kirksville Water Association.

C. Map

The Kirksville Water Association map shows the area where the White Hall water line is run at Tates Creek.

D. Environmental Impacts

The only additional impact for this alternative is the crossing of a flood plain (Tates Creek) to serve this area.

E. Land Requirements

Additional easements would be needed to run the water lines.

F. Construction Problem

Construction cost and conditions would be similar for the alternate and proposed project except for the crossing of Tates Creek, the ductile iron line along Jacks Creek in the alternate project.

G. Cost Estimate

No cost estimate was done for the alternate since the cost would be higher. The O & M cost would be higher considering the potential for higher pressure on the water line.

H. Advantages/Disadvantages

The alternate would have higher initial cost and maintenance cost with no advantages to the residents of Cuzick.

VI. Proposed Project

A. Project Design

The water supplies to this project will be purchased from Richmond Water, Gas & Sewerage as is all water used by the Association. The water to serve this area will be pumped from the master meter through the existing pump and lines to the Newby elevated water storage tank. The Cuzick extension will tieon the existing system at Long Branch Road. All water lines will be 4 inch and are shown on the maps in Exhibit I.

A computer generated hydraulic analysis with a map showing the nodes is included in Exhibit VI. A peaking factor of 3.0 was used in the hydraulic analysis. This analysis shows gravity flow from tanks, for peak and normal conditions and combinations of both of the pumps running for peak conditions. The hydraulic analysis shows that this project can be designed to Rural Development requirements. A main line pressure reducing valve will be required but is not shown on the hydraulic analysis (high pressure).

B. Cost Estimate

(a) Construction Cost

	Description	Quantity	Unit	Unit Price	Total Cost
1.	4" Cl. 200 Water Main	47,980	LF	$4.10	$196,718
2.	4" Cl. 250 Water Main	10,250	LF	$4.45	$45,612
3.	4" Gate Valves	24	EA	$325	$7,800
4.	4" Flush Hydrant	15	EA	$910	$13,650
5.	Meters w/ Service Pipe	74	EA	$485	$35,890
6.	Creek Crossing	1	EA	$1,500	$1,500
7.	Pressure Reducing Valve	1	EA	$9,000	$9,000

8.	Air Relief Valve	4	EA	$330	$1,320
9.	Miscellaneous (Includes bores, open cuts, concrete and crushed stone)	1	LS	$24,000	$24,000
Total Construction Cost:					$335,490

(b) Project Cost

1.	Land and Right of Way		$500
2.	Construction Cost		$335,490
3.	Engineering (from Rural Development fee schedule)		
	a. Preliminary Engineering	$10,000	
	b. Design (10.1%)	$33,880	
	c. Inspection (7.5)	$25,160	
	Total		$69,040
4.	Interest During Construction		$8,000
5.	Legal		$6,000
6.	Contingencies (7%)		$23,470
Total:			$442,500

(c) Funding Sources

FmHA - Grant and Loan	$409,200	
Tap-on Fees (450 x 74)	$33,300	
Total:		$442,500

C. Annual Operating Budget

There will be no rate increase for this project with the rates being as shown in Exhibit IV. Included in Exhibit I is information related to projected income, operation and maintenance cost, water purchase cost, debt repayment and the reserve.

VII. Conclusion and Recommendations

With this project shown to be economically and technically feasible, with a grant, it is recommended that this project proceeds in attempts to obtain a Rural Development grant and loan for funding of the project.

EXHIBIT I

Summary/Addendum to Preliminary
Engineering Report
Kentucky guide 7A

KENTUCKY GUIDE 7A
June 1991

SUMMARY/ADDENDUM

TO

PRELIMINARY ENGINEERING REPORT

Dated June 11, 1997

FOR

Kirksville Water Association
(Name of Water Facility Project)

Applicant Contact Person Earl Jackson

Applicant Phone Number 606-624-1735

In order to avoid unnecessary delays in application processing, the applicant and its consulting engineer should prepare a summary of the preliminary engineering report in accordance with this Guide. Feasibility review and grant determinations may be processed more accurately and more rapidly if the Summary/Addendum is submitted simultaneously with the preliminary engineering report, or as soon thereafter as possible.

I. General

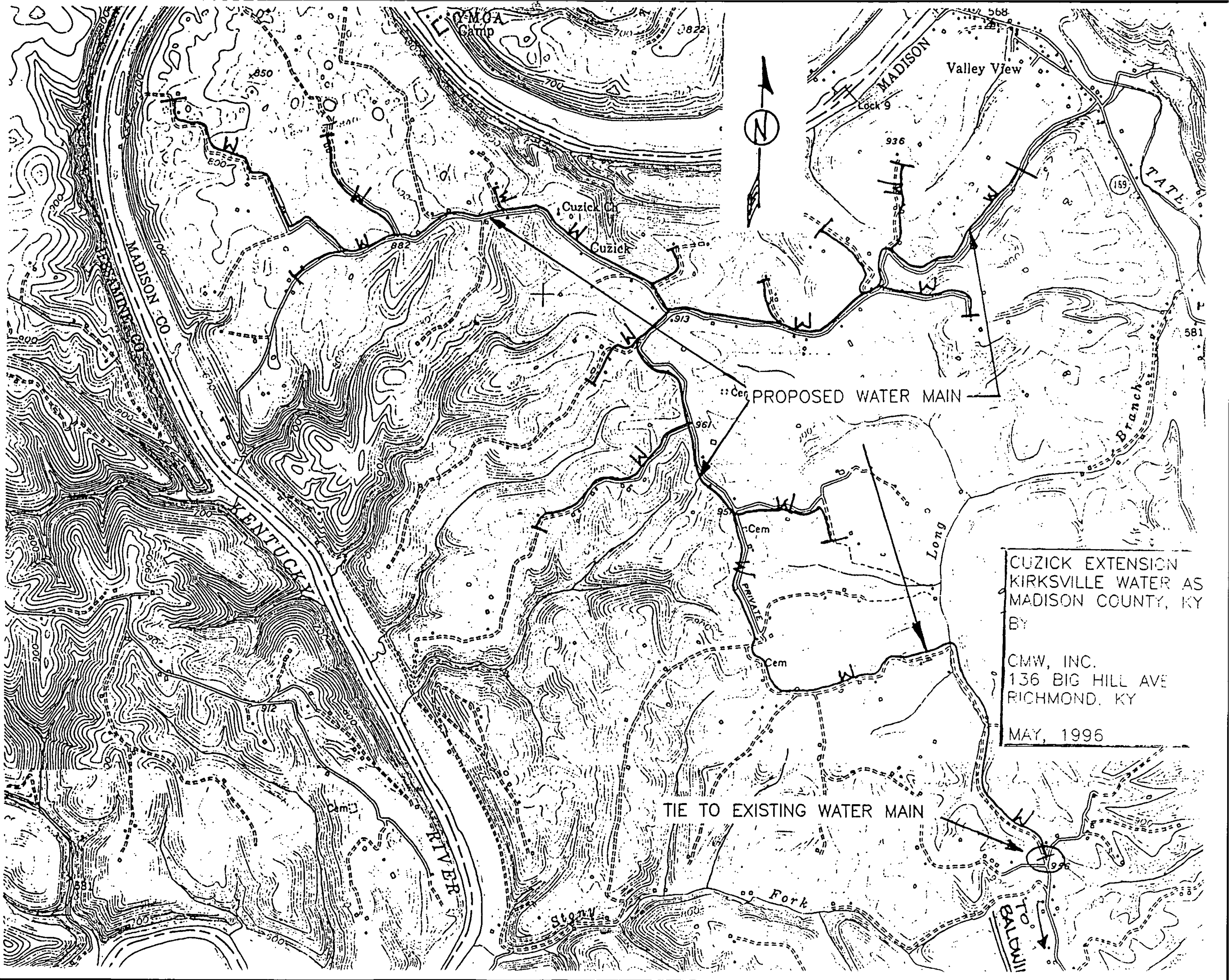
A. Area to be Served: In addition to this summary, the applicant/engineer should submit a project map of the service area showing the following:

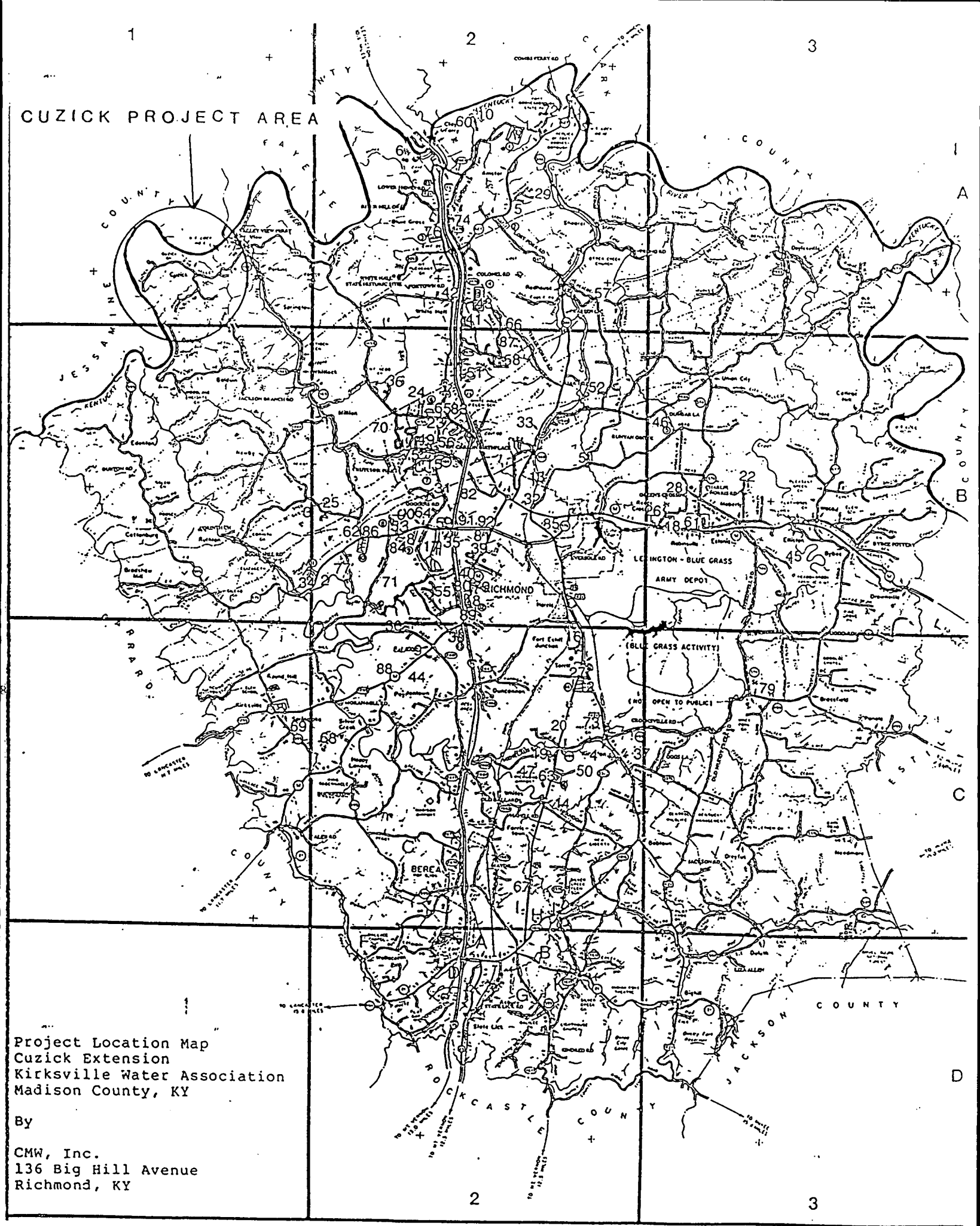
1. Existing Facilities - Location and Size.

2. Proposed Facilities - Location and Size.

3. New User Location - Also attach a list of new users, by road.

4. Breakdown of project cost for each branch line.


CUZICK EXTENSION
KIRKSVILLE WATER AS
MADISON COUNTY, KY
BY
CMW, INC.
136 BIG HILL AVE
RICHMOND, KY
MAY, 1996
PROPOSED WATER MAIN
TIE TO EXISTING WATER MAIN
TO BALDWI
Valley View
MADISON
Lock 9
YMCA Camp
Cuzick Ch
Cuzick
Cem
PRIVATE
Long
Branch
TATE
Stony
Fork
KENTUCKY
RIVER
MADISON CO
JESSAMINE CO
N



Project Location Map
Cuzick Extension
Kirksville Water Association
Madison County, KY

By

CMW, Inc.
136 Big Hill Avenue
Richmond, KY

Customer Signup List

Name	Meters
1. Homer Renfro	1
2. Dean Rhodus	1
3. Donald Abney	1
4. Chris Rhodus	1
5. Mike Azbill	1
6. Bill Green	2
7. Harry Willis	1
8. Vernon Mathis	1
9. Danny Renfro	1
10. John Robinson	1
11. Les Bryant	1
12. Bob Herron	2
13. Eb Willis	2
14. Gerald Richardson	2
15. Charles White	1
16. Keith Hendrix	2
17. Stanley Kelley	1
18. Dwight Renfro	1
19. Baily Griggs	1
20. Scott Owen	1
21. Wayne Lynch	1
22. Baily Griggs	1
23. Wayne Griggs	2
24. John Robinson	1

25.	Roy Renfro	1
26.	John Robinson	1
27.	Mark Morgan	1
28.	Troy Richardson	2
29.	Nellie Mae Farm	1
30.	Paul Richardson	2
31.	Larry Richardson	1
32.	James Fain	1
33.	Robert Ashcraft	1
34.	Susie Perkins	1
35.	Jerry Hacker	1
36.	Jerry Perkins	1
37.	Steve Perkins	2
38.	Wendell Pitts	2
39.	William R. Renfro	1
40.	Richard Green	2
41.	Ed Northern	1
42.	Dennis Mullinx	2
43.	McClellan Davis	1
44.	Virgil Renfro, Jr.	2
45.	Billy Renfro	1
46.	Allie Renfro	1
47.	Robert Show	2
48.	Blanche Burdine	3
49.	Everett McKinney	1
50.	Floyd French	1
51.	Marlena Agee	1

52.	Indian Rock Farm	1
53.	Stanley Fain	1
54.	David Sanders	3
55.	John Robinson	1

Note: Potential customers were obtained on survey of community and are committed to sign up for water service.

Construction Cost Estimate
Cuzick Water Main Extension

	Description	Quantity	Unit	Unit Price	Total Cost
1.	4" Cl. 200 Water Main	47,980	LF	4.10	196,718
2.	4" Cl. 250 Water Main	10,250	LF	4.45	45,612
3.	4" Gate Valves	24	EA	325	7,800
4.	4" Flush Hydrant	15	EA	910	13,650
5.	Meters w/ Service Pipe	74	EA	485	35,890
6.	Creek Crossing	1	EA	1,500	1,500
7.	Pressure Reducing Valve	1	EA	9,000	9,000
8.	Air Relief Valve	4	EA	330	1,320
9.	Miscellaneous (Includes bores, open cuts, concrete and crushed stone)	1	LS	24,000	24,000
	Total Construction Cost:				$335,490

II. FACILITY CHARACTERISTICS OF EXISTING WATER SYSTEM

A. Water Source: Describe adequacy of source (quality and quantity). Include an explanation of raw water source, raw water intake structure, treatment plant capacity, and current level of production (WTP). Also describe the adequacy of Water Purchase Contract if applicable.

Kirksville Water Association purchases all water from Richmond Water, Gas & Sewerage which averages 6,000,000 gallons per month. The Association has a water purchase agreement for a maximum limit not to exceed an average per year of 6,000,000 gallons per month. The Association is currently negotiating with Richmond Utilities on new contract.

If the applicant purchases water:

Seller(s): Richmond Water, Gas & Sewerage

Price/1,000 gallons: $2.06 (1.54/100 C.F.) actual

Present Estimated Market Value of Existing System: $ 1,489,157

B. Water Storage:

Type: Ground Storage Tank_____ Elevated Tank 2

Standpipe_____ Other

Number of Storage Structures

Total Storage Volume Capacity 225,000

Date Storage Tank(s) Constructed 1976, 1989

C. Water Distribution System:

Pipe Material All PVC

Lineal Feet of Pipe: 3" Diameter 27,720 4" 186,120

2" 2,640 6" 186,300 8" 2,640 10"____ 12"_____

Date(s) Water Lines Constructed 1975-1977, 1989-1991

Number and Capacity of Pump Station(s) 2 - Duel pump station - 232 gpm and 181 gpm

D. Condition of Existing Water System:

Briefly describe the condition and suitability for continued use of facility now owned by the applicant. Include any major renovation that will be needed within five to ten years.

Quality of water provided by Richmond is good and meets all federal and state requirements.

III. EXISTING LONG-TERM INDEBTEDNESS

A. List of Bonds and Notes:

Date of Issue	Principal Balance	Interest & Principal Payment	Pymt Date	Bond/Note Holder	Amount on Deposit in Reserve Acct
19 75 Issue	$ 235,389	$ 20,292	7/15	FmHA	$50,000 for both
19 89 Issue	$ 597,009	$ 42,774	9/25	FmHA	
19 94 Issue	$ 93,104	$ 5,181	4/1	FmHA	
19 ___ Issue	$	$			
19 ___ Issue	$	$			
19 ___ Issue	$	$			

IV. LAND AND RIGHTS - EXISTING SYSTEM(S)

Number of Treatment Plant Sites	0
Number of Storage Tank Sites	2
Number of Pump Stations	2 (Easements)
Total Acreage	0.27 Acres
Purchase Price	$ 2,000

V. NUMBER OF EXISTING USERS

A. Water Users:

Residential Size Meters (In Town)* 1,240

Residential Size Meters/Farmers (Out of Town)* _____

Larger Users (Larger Than 5/8" Meter (In Town) _____

Commercial Users (Out of Town) 22

Total 1,262

Number of Total Potential Users Living in the Service Area 1,300±

*NOTE: Residential/Farmers Users: Classify by type of user regardless of quantity of water used. This classification should include those meters serving individual rural residence size meters and farmers.

VI. CURRENT CONNECTION FEES FOR EACH SIZE METER CONNECTION

Meter Size	Connection Fee	Minimum Water Usage for Each Size Meter
5/8" x 3/4"	$ 450	2,000 gallons
1-Inch	$ 450 + materials	2,000 gallons
1-1/2" Inch	$ 450 + materials	2,000 gallons
2-Inch	$ 450 + materials	2,000 gallons
3-Inch	$	gallons
4-Inch	$	gallons
5-Inch	$	gallons
6-Inch	$	gallons

VII. WATER RATES - EXISTING RATE SCHEDULE

Date this rate went into effect: 4/1/94

Meter Size all meters:

First 2000 Gallons @ $ 11.62 Minimum.

Next 3000 Gallons @ $ 5.56 per 1,000 Gallons.

Next 5000 Gallons @ $ 4.51 per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over 10,000 Gallons @ $ 3.51 per 1,000 Gallons.

Meter Size _____:

First _____ Gallons @ $_____ Minimum.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over _____ Gallons @ $_____ per 1,000 Gallons.

Meter Size _____:

First _____ Gallons @ $_____ Minimum.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over _____ Gallons @ $_____ per 1,000 Gallons.

VII. Existing Rate Schedule (Continued)

Meter Size _____:

First _____ Gallons @ $_____ Minimum.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over_____ Gallons @ $_____ per 1,000 Gallons.

Meter Size _____:

First _____ Gallons @ $_____ Minimum.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over_____ Gallons @ $_____ per 1,000 Gallons.

VIII. ANALYSIS OF ACTUAL WATER USAGE - EXISTING SYSTEM - 12 MONTH PERIOD

For Period January 1996 to December 1996.
(Adjusted for 6/97 customers)

Meter Size	MONTHLY WATER USAGE	Average	Residential/ Farmer		Non-Residential/ Commercial	
			No. of Users	Usage (1000)	No. of Users	Usage (1000)
	0 - 2,000 Gal.	1,000	256	256.0	9	9.0
	2,000 - 3,000 Gal.	2,500	128	320.0	2	5.0
	3,000 - 4,000 Gal.	3,500	147	514.5	2	7.0
	4,000 - 5,000 Gal.	4,500	157	706.5	3	13.5
	5,000 - 6,000 Gal.	5,500	135	742.5		
	6,000 - 7,000 Gal.	6,500	139	903.5		
5/8 x	7,000 - 8,000 Gal.	7,500	91	682.5		
	8,000 - 9,000 Gal.	8,500	64	544.0		
3/4	9,000 - 10,000 Gal.	9,500	44	418.0		
	10,000 - 11,000 Gal.	10,500	27	283.5		
Inch	11,000 - 12,000 Gal.	11,500	12	138.0		
	12,000 - 13,000 Gal.	12,500	9	112.5		
	13,000 - 14,000 Gal.	13,500	8	108.0		
	14,000 - 15,000 Gal.	14,500	5	72.5		
	15,000 - 16,000 Gal.	15,500	2	31.0	1	15.5
	16,000 - 17,000 Gal.	16,500	2	33	1	16.5
	17,000 - 18,000 Gal.	17,500	3	52.5	1	17.5
	18,000 - 19,000 Gal.	18,500	1	18.5	1	18.5
	19,000 - 20,000 Gal.	19,500	1	19.5		
	20,000 - 30,000 Gal.	25,000	6	150.0		
	30,000 - 40,000 Gal.	35,000	3	105.0		
	Over - 40,000 Gal.	60,000			2	120.0
		Sub-Total	(1240)	(6,211.5)	(22)	(222.5)
		Average Usage		(5.01)		(10.1)
	_____ Gal.	_____				
	_____ Gal.	_____				
1-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
		Sub-Total	(_____)	(_____)	(_____)	(_____)
	_____ Gal.	_____				
	_____ Gal.	_____				
1-1/2	_____ Gal.	_____				
	_____ Gal.	_____				
Inch	_____ Gal.	_____				
		Sub-Total	(_____)	(_____)	(_____)	(_____)

Continued .....

VIII. continued .....

Meter Size	MONTHLY WATER USAGE	Average	Residential/ Farmer No. of Users	Residential/ Farmer Usage (1000)	Non-Residential/ Commercial No. of Users	Non-Residential/ Commercial Usage (1000)
2-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	Sub-Total		( )	( )	( )	( )
3-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	Sub-Total		( )	( )	( )	( )
4-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	Sub-Total		( )	( )	( )	( )
5-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	Sub-Total		( )	( )	( )	( )
6-Inch	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	_____ Gal.	_____				
	Sub-Total		( )	( )	( )	( )
	Total		( )	( )	( )	( )
Total Water Purchased and/or Produced			6,956,880		249,200	
Total Water Sold			6,211,500		222,500	

IX. FACILITY CHARACTERISTICS OF PROPOSED WATER SYSTEM

A. Water Source: Describe adequacy of source (quality and quantity). Include an explanation of raw water source, raw water intake structure, treatment plant capacity, and current level of production (WTP). Also describe the adequacy of Water Purchase Contract if applicable.

Quality of water is good and is for monthly average of 6,000,000 gallons per month. With this extension the amount of water needed will exceed 6,000,000 gallons per month. Kirksville Water Association is talking with Richmond Utilities on contract revision.

B. Water Storage:

Type: Ground Storage Tank_____ Elevated Tank_____

Standpipe_____ Other_____

Number of Storage Structures 0

Total Storage Volume Capacity 0

C. Water Distribution System:

Pipe Material PVC

Lineal Feet of Pipe: 3" Diameter_____ 4" 58,230 6"_____

8"_____ 10"_____ 12"_____

Number and Capacity of Pump Station(s)_____

X. LAND AND RIGHTS - PROPOSED WATER SYSTEM(S)

Number of Treatment Plant Sites	0
Number of Pump Sites	0
Number of Other Sites (Storage Tank)	0
Total Acreage	0 Acres
Purchase Price	$ 0

XI. NUMBER OF NEW USERS

A. Water Users:

Residential Size Meters (In Town)*	0
Residential Size Meters/Farmers (Out of Town)*	74
Larger Users (Larger Than 5/8" Meter (In Town)	0
Larger Users (Larger Than 5/8" Meter (Out of Town)	0
Total	74
Number of Total Potential Users Living in the Service Area	85

*NOTE: Residential/Farmers Users: Classify by type of user regardless of quantity of water used. This classification should include those meters serving individual rural residence size meter and farmers.

XII. PROPOSED CONNECTION FEES FOR EACH SIZE METER CONNECTION

Meter Size	Connection Fee	Minimum Water Usage for Each Size Meter
5/8" x 3/4"	$ 450	2,000 gallons
1-Inch	$ 450±	2,000 gallons
1-1/2" Inch	$ 450 + material	2,000 gallons
2-Inch	$ 450 + material	2,000 gallons
3-Inch	$	gallons
4-Inch	$	gallons
5-Inch	$	gallons
6-Inch	$	gallons

XIII. WATER RATES - PROPOSED

A. Proposed Rate Schedule:

First 2,000 Gallons @ $ 11.62 Minimum.

Next 3,000 Gallons @ $ 5.56 per 1,000 Gallons.

Next 5,000 Gallons @ $ 4.51 per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

Next _____ Gallons @ $_____ per 1,000 Gallons.

All Over 10,000 Gallons @ $ 3.51 per 1,000 Gallons.

IF MORE THAN ONE RATE, USE ADDITIONAL SHEETS.

XIV.

KIRKSVILLE WATER ASSOCIATION, INC.
EXISTING CUSTOMERS, PROPOSED RATES

FIRST	2,000 GALLONS	$ 11.62	MINIMUM/MONTH
NEXT	3,000 GALLONS	$ 5.56	PER 1000 GALLONS
NEXT	5,000 GALLONS	$ 4.51	PER 1000 GALLONS
NEXT	15,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	25,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	50,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	100,000 GALLONS	$ 3.51	PER 1000 GALLONS

ANALYSIS OF MONTHLY WATER USAGE AND INCOME

MONTHLY WATER USAGE	AVERAGE USAGE	NUMBER OF USERS	TOTAL USAGE	PROJECTED INCOME
0 - 2,000 GALLONS	1,000	256	256,000	$ 2,974.72
2,000 - 3,000 GALLONS	2,500	128	320,000	$ 1,843.20
3,000 - 4,000 GALLONS	3,500	147	514,500	$ 2,934.12
4,000 - 5,000 GALLONS	4,500	157	706,500	$ 4,006.64
5,000 - 6,000 GALLONS	5,500	135	742,500	$ 4,125.60
6,000 - 7,000 GALLONS	6,500	139	903,500	$ 4,873.34
7,000 - 8,000 GALLONS	7,500	91	682,500	$ 3,601.78
8,000 - 9,000 GALLONS	8,500	64	544,000	$ 2,821.76
9,000 - 10,000 GALLONS	9,500	44	418,000	$ 2,138.40
10,000 - 11,000 GALLONS	10,500	27	283,500	$ 1,420.47
11,000 - 12,000 GALLONS	11,500	12	138,000	$ 673.44
12,000 - 13,000 GALLONS	12,500	9	112,500	$ 536.67
13,000 - 14,000 GALLONS	13,500	8	108,000	$ 505.12
14,000 - 15,000 GALLONS	14,500	5	72,500	$ 333.20
15,000 - 16,000 GALLONS	15,500	2	31,000	$ 140.32
16,000 - 17,000 GALLONS	16,500	2	33,000	$ 147.34
17,000 - 18,000 GALLONS	17,500	3	52,500	$ 231.54
18,000 - 19,000 GALLONS	18,500	1	18,500	$ 80.69
19,000 - 20,000 GALLONS	19,500	1	19,500	$ 84.20
20,000 - 30,000 GALLONS	25,000	6	150,000	$ 621.00
30,000 - 40,000 GALLONS	35,000	3	105,000	$ 415.80
50,000 - 175,000 GALLONS	112,500	0	0	$ 0.00
MONTHLY TOTALS		1,240	6,211,500	$ 34,509.35
YEARLY TOTALS		14,880	74,538,000	$ 414,112.17
MONTHLY AVERAGE PER CUSTOMER			5,009	$ 27.83

XIV.

KIRKSVILLE WATER ASSOCIATION
COMMERCIAL CUSTOMERS PROPOSED RATES

FIRST	2,000 GALLONS	$ 11.62	MINIMUM/MONTH
NEXT	3,000 GALLONS	$ 5.56	PER 1000 GALLONS
NEXT	5,000 GALLONS	$ 4.51	PER 1000 GALLONS
NEXT	15,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	25,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	50,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	100,000 GALLONS	$ 3.51	PER 1000 GALLONS

ANALYSIS OF MONTHLY WATER USAGE AND INCOME

MONTHLY WATER USAGE	AVERAGE USAGE	NUMBER OF USERS	TOTAL USAGE	PROJECTED INCOME
0 - 2,000 GALLONS	1,000	9	9,000	$ 104.58
2,000 - 3,000 GALLONS	2,500	2	5,000	$ 28.80
3,000 - 4,000 GALLONS	3,500	2	7,000	$ 39.92
4,000 - 5,000 GALLONS	4,500	3	13,500	$ 76.56
5,000 - 6,000 GALLONS	5,500	0	0	$ 0.00
6,000 - 7,000 GALLONS	6,500	0	0	$ 0.00
7,000 - 8,000 GALLONS	7,500	0	0	$ 0.00
8,000 - 9,000 GALLONS	8,500	0	0	$ 0.00
9,000 - 10,000 GALLONS	9,500	0	0	$ 0.00
10,000 - 11,000 GALLONS	10,500	0	0	$ 0.00
11,000 - 12,000 GALLONS	11,500	0	0	$ 0.00
12,000 - 13,000 GALLONS	12,500	0	0	$ 0.00
13,000 - 14,000 GALLONS	13,500	0	0	$ 0.00
14,000 - 15,000 GALLONS	14,500	0	0	$ 0.00
15,000 - 16,000 GALLONS	15,500	1	15,500	$ 70.16
16,000 - 17,000 GALLONS	16,500	1	16,500	$ 73.67
17,000 - 18,000 GALLONS	17,500	1	17,500	$ 77.18
18,000 - 19,000 GALLONS	18,500	1	18,500	$ 80.69
19,000 - 50,000 GALLONS	34,500	0	0	$ 0.00
50,000 - 70,000 GALLONS	60,000	2	120,000	$ 452.70
MONTHLY TOTALS		22	222,500	$ 1,004.26
YEARLY TOTALS		264	2,670,000	$ 12,051.12
MONTHLY AVERAGE PER CUSTOMER			10,114	$ 45.65

H2ORATE XEQ 06-12-97

XV.

KIRKSVILLE WATER ASSOCIATION, INC.
CUZICK PROPOSED CUSTOMERS

FIRST	2,000 GALLONS	$ 11.62	MINIMUM/MONTH
NEXT	3,000 GALLONS	$ 5.56	PER 1000 GALLONS
NEXT	5,000 GALLONS	$ 4.51	PER 1000 GALLONS
NEXT	15,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	25,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	50,000 GALLONS	$ 3.51	PER 1000 GALLONS
NEXT	100,000 GALLONS	$ 3.51	PER 1000 GALLONS

ANALYSIS OF MONTHLY WATER USAGE AND INCOME

MONTHLY WATER USAGE	AVERAGE USAGE	NUMBER OF USERS	TOTAL USAGE	PROJECTED INCOME
0 - 2,000 GALLONS	1,000	19	19,000	$ 220.78
2,000 - 3,000 GALLONS	2,500	9	22,500	$ 129.60
3,000 - 4,000 GALLONS	3,500	10	35,000	$ 199.60
4,000 - 5,000 GALLONS	4,500	10	45,000	$ 255.20
5,000 - 6,000 GALLONS	5,500	7	38,500	$ 213.92
6,000 - 7,000 GALLONS	6,500	6	39,000	$ 210.36
7,000 - 8,000 GALLONS	7,500	4	30,000	$ 158.32
8,000 - 9,000 GALLONS	8,500	3	25,500	$ 132.27
9,000 - 10,000 GALLONS	9,500	3	28,500	$ 145.80
10,000 - 11,000 GALLONS	10,500	1	10,500	$ 52.61
11,000 - 12,000 GALLONS	11,500	1	11,500	$ 56.12
12,000 - 13,000 GALLONS	12,500	1	12,500	$ 59.63
13,000 - 14,000 GALLONS	13,500	0	0	$ 0.00
14,000 - 15,000 GALLONS	14,500	0	0	$ 0.00
15,000 - 16,000 GALLONS	15,500	0	0	$ 0.00
16,000 - 17,000 GALLONS	16,500	0	0	$ 0.00
17,000 - 18,000 GALLONS	17,500	0	0	$ 0.00
18,000 - 19,000 GALLONS	18,500	0	0	$ 0.00
19,000 - 20,000 GALLONS	19,500	0	0	$ 0.00
20,000 - 30,000 GALLONS	25,000	0	0	$ 0.00
30,000 - 40,000 GALLONS	35,000	0	0	$ 0.00
40,000 - 50,000 GALLONS	45,000	0	0	$ 0.00
MONTHLY TOTALS		74	317,500	$ 1,834.21
YEARLY TOTALS		888	3,810,000	$ 22,010.52
MONTHLY AVERAGE PER CUSTOMER			4,291	$ 24.79

XVI. CURRENT OPERATING BUDGET - (As of the last full operating year)

A. Operating Income:

Water Sales	$ 390,125
Disconnect/Reconnect/Late Charge Fees	
Other (Describe) Miscellaneous	2,829
Less Allowances and Deductions	(392,954)
Total Operating Income.....	$ 392,954

B. Operation and Maintenance Expenses:
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)

Source of Supply Expense	$ 0
Pumping Expense	0
Water Treatment Expense (Water Purchase)	149,993
Transmission and Distribution Expense	48,855
Customer Accounts Expense	31,017
Administrative and General Expense	51,911
Total Operating Expenses.....	$ 281,776
Net Operating Income.....	$ 111,178

C. Non-Operating Income:

Interest on Deposits	$ 11,213
Other (Identify) (Interest on refunded meters)	-(220)
Total Non-Operating Income.....	$ 10,993

D. Net Income..... $ 122,171

E. Debt Repayment:

FmHA Interest	$ 68,247
FmHA Principal	
Non-FmHA Interest	
Non-FmHA Principal	
Total Debt Repayment	$ 68,247

F. Balance Available for Coverage and Depreciation... $ 53,924

XVII. PROPOSED OPERATING BUDGET - EXISTING & NEW USERS
(1st Full Year of Operation) Year Ending 1998

A. Operating Income:

Water Sales	$ 448,174
Disconnect/Reconnect/Late Charge Fees	
Other (Describe)	3,204
Less Allowances and Deductions	( )
Total Operating Income	$ 451,378

B. Operation and Maintenance Expenses:
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)

Source of Supply Expense	$ 0
Pumping Expense	0
Water Treatment Expense	167,838
Transmission and Distribution Expense	56,124
Customer Accounts Expense	35,632
Administrative and General Expense	59,635
Total Operating Expenses	$ 319,229
Net Operating Income	$ 132,149

C. Non-Operating Income:

Interest on Deposits	$ 13,356
Other (Identify)	-($250)
Total Non-Operating Income	$ 13,106

D. Net Income $ 145,255

E. Debt Repayment:

FmHA Interest	$ 73,806
FmHA Principal	
Non-FmHA Interest	
Non-FmHA Principal	
Total Debt Repayment	$ 73,806

F. Balance Available for Coverage and Depreciation... $ 71,449

XVIII. PROPOSED OPERATING BUDGET - NEW USERS - EXTENSION ONLY
(1st Full Year of Operation) Year Ending 1998

A. Operating Income:

Water Sales	$ 22,011
Disconnect/Reconnect/Late Charge Fees	
Other (Describe)	
Less Allowances and Deductions	( )
Total Operating Income	$ 22,011

B. Operation and Maintenance Expenses:
(Based on Uniform System of Accounts prescribed by National Association of Regulatory Utility Commissioners)

Source of Supply Expense	$ 0
Pumping Expense	0
Water Treatment Expense	8,790
Transmission and Distribution Expense	1,975
Customer Accounts Expense	1,254
Administrative and General Expense	2,098
Total Operating Expenses	$ 14,117
Net Operating Income	$ 7,894

C. Non-Operating Income:

Interest on Deposits	$ 653
Other (Identify)	
Total Non-Operating Income	$ 653

D. Net Income $ 8,547

E. Debt Repayment:

FmHA Interest	$ 5,559
FmHA Principal	
Non-FmHA Interest	
Non-FmHA Principal	
Total Debt Repayment	$ 5,559

F. Balance Available for Coverage and Depreciation... $ 2,988

XIX. ESTIMATED PROJECT COST - WATER

Development	$ 335,490
Land and Rights	500
Legal	6,000
Engineering	69,040
Interest	8,000
Contingencies	23,470
Initial Operating and Maintenance	0
Other	0
TOTAL	442,500

XX. PROPOSED PROJECT FUNDING

Applicant - User Connection Fees	$ 33,300
Other Applicant Contribution	
FmHA Loan	102,300
FmHA Grant	306,900
Other (Specify)	
Other (Specify)	
Other (Specify)	
Other (Specify)	
TOTAL	$ 442,500

EXHIBIT II

Request for Environmental
Information

(Previously submitted under separate cover)

EXHIBIT III

Feasibility Study

Cuzick Water Main Extension

Feasibility Study

For

Kirksville Water Association

By
CMW, Inc.
136 Big Hill Avenue
Richmond, Kentucky

May, 1996
(Revised)

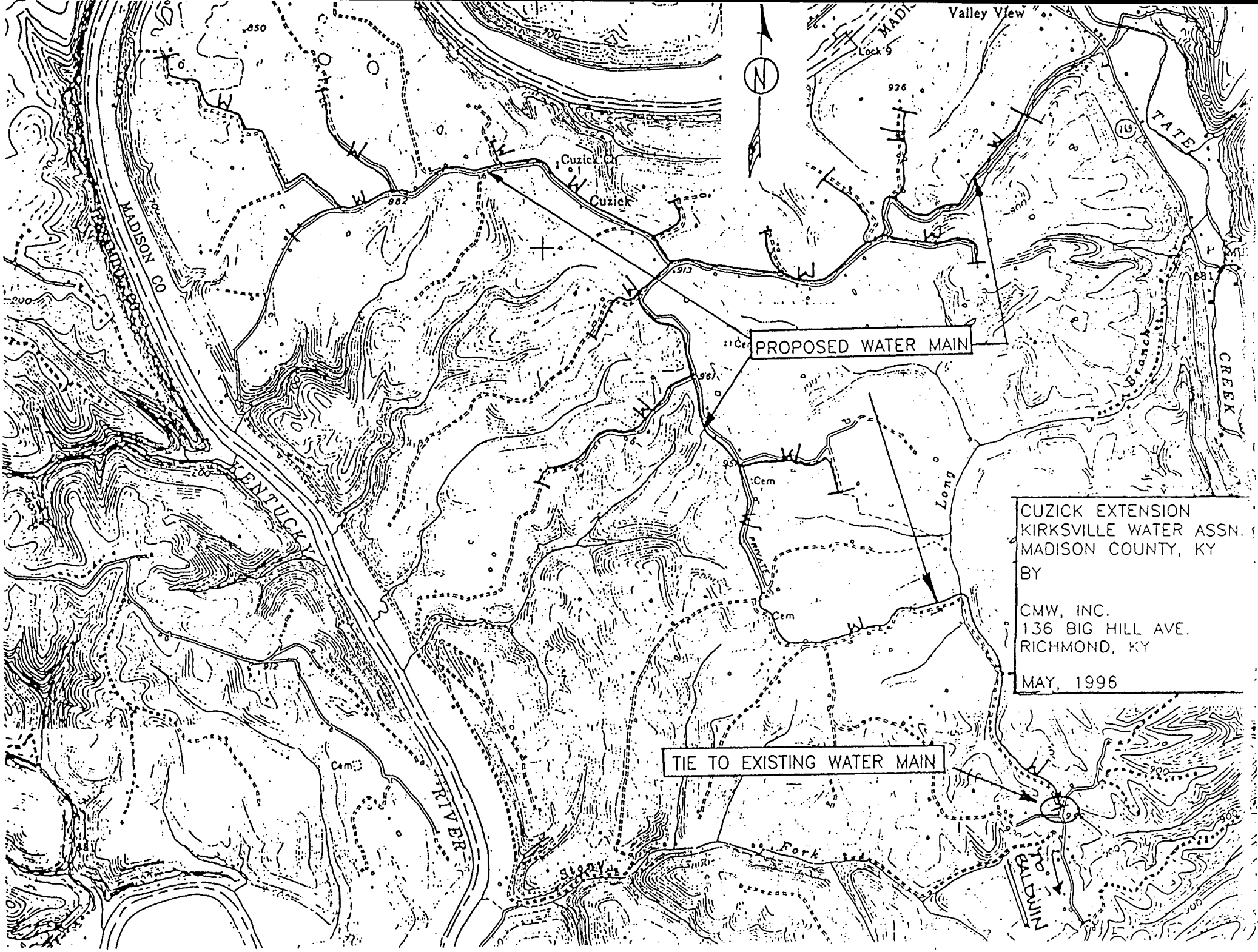
Table of Contents

I. Introduction

Kirksville Water Association currently serves 1155 customers in Madison County. Kirksville has approximately 70 miles of 6", 4" and 3" water mains, a 125,000 gallon elevated water storage tank, a 100,000 gallon elevated water storage tank and two booster pumping stations.

II. Cuzick Water Main Extension

The community of Cuzick is 3.5 miles from the Kirksville Water Association water main on Long Branch Road. The feasibility study includes 11.0 miles of 4" water main which would encompass 74 customers. This shows that there would be 6.7 customers per mile. The location of the proposed water mains are shown on the attached map.


PROPOSED WATER MAIN
TIE TO EXISTING WATER MAIN
CUZICK EXTENSION
KIRKSVILLE WATER ASSN.
MADISON COUNTY, KY
BY
CMW, INC.
136 BIG HILL AVE.
RICHMOND, KY
MAY, 1996
Cuzick Cr
Cuzick
Valley View
Lock 9
TATE
CREEK
Branch
Long
Fork
MADISON CO
KENTUCKY
RIVER
TO BALDWIN
Cem

IV. Construction Cost Estimate
Cuzick Water Main Extension

	Description	Quantity	Unit	Unit Price	Total Cost
1.	4" Cl. 200 Water Main	47,980	LF	4.10	196,718
2.	4" Cl. 250 Water Main	10,250	LF	4.45	45,612
3.	4" Gate Valves	24	EA	325	7,800
4.	4" Flush Hydrant	15	EA	910	13,650
5.	Meters w/ Service Pipe	74	EA	485	35,890
6.	Creek Crossing	1	EA	1,500	1,500
7.	Pressure Reducing Valve	1	EA	9,000	9,000
8.	Air Relief Valve	4	EA	330	1,320
9.	Miscellaneous (Includes bores, open cuts, concrete and crushed stone)	1	LS	24,000	24,000
	Total Construction Cost:				$335,490

V. Project Cost
Cuzick Water Main Extension

1.	Land and Right of Way		$500
2.	Construction Cost		$335,490
3.	Engineering (from FmHA fee schedule)		
	a. Preliminary Engineering	$10,000	
	b. Design (10.1%)	$33,880	
	c. Inspection (7.5%)	$25,160	
	Total		$69,040
4.	Interest During Contruction		$8,000
5.	Legal		$6,000
6.	Contingencies (7%)		$23,470
	Total		$442,500

Funding Source

FmHA - Grant and Loan	$409,200
Tap-on Fees (450 x 74)	$33,300
Total	$442,500

VI. Operating Cost

The operating cost summary shown below was based on the 1995 audit as prepared by Adams, Hill, McDaniels & Co., PSC. The items for the Cuzick extension were based on actual cost or on a percentage increase similar to the increase in customers. The loan payments were based on a 40 year loan at 4 1/2% interest from Rural Economic and Community Development (formerly FmHA).

	Current (1155 customers)	Cuzick (74 customers)	Combination (1229 customers)
Operating Income	382,738	24,521	407,259
Miscellaneous Income	3,260	208	3,468
Interest Income	10,119	649	10,768
Total Operating Revenue:	396,117	25,378	421,495
Operating Expense			
Meter Changeout	1,392	0	1,392
Cut Off and Service Calls	4,937	316	5,253
Water Purchased	164,273	10,525	174,798
Salaries	37,603	1,204	38,807
Insurance	5,217	334	5,551
Postage	3,401	218	3,619
Plant Utilities	5,810	372	6,182
Commissioner's Fee	15,100	0	15,100
Taxes	1,981	127	2,108
Office Utilities	455	0	455
Telephone	1,492	0	1,492
Rent	1,900	0	1,900
Office Supplies	1,294	83	1,377
Legal and Professional Services	7,286	466	7,752
Miscellaneous Expense	2,924	187	3,111
Public Service Commission Assessment	547	35	582
Repairs	30,619	1,962	32,581
Depreciation	60,841	3,899	64,740
Interest on Refunded Meter Deposits	367	23	390
Total Operating Expenses:	$347,439	19,751	367,190

100% Loan - No Grant			
Operating Income	48,678	5,627	54,305
Interest on Long Term Debt	54,159	22,236	76,395
Income	(-5,481)	(-16,609)	(-22,090)
75% Grant 25% Loan			
Operating Income	48,678	5,627	54,305
Interest on Long Term Debt	54,159	5,559	59,718
Income	(-5,481)	+68	(-5,413)

Water System Hydraulics

The hydraulics of the existing water system and proposed addition for Cuzick was reviewed. The water to serve Cuzick will come from the Newby tank along Maple Grove Road and Jackson Branch to Baldwin and down Long Branch Road to the beginning of the proposed project. The existing water system can provide the Cuzick area with water at an adequate pressure.

With the addition of the 74 proposed customers, the pumping time for the Barnes Mill Pump Station will be increased by approximately 1.0 hour for a total estimated time of 16.6 hours per day. Due to the City of Richmond increasing the size of the water main to serve the pump station to 12 inch, larger impelliers can be installed as was originally designed. The pump motor was sized for the larger impelliers. This will significantly decrease the amount of pump usage.

VIII. Water Storage Availability

There is currently 225,00 gallons of storage available for use with Kirksville's daily usage of 171 gallons per day per customer. The Water Association will need 210,159 gallons to meet Public Service Commission requirements with the addition of the proposed Cuzick customers. The Association needs to start planning to add additional storage capacity to the system since the remaining storage capacity could be gone with a couple of large subdivisions.

IX. Recommendation

Since this project with a 75% grant would add positive income to Kirksville Water Association, I recommend that the Water Association apply for a grant and loan from RECD. Before the project is bid, all 74 customers must pay tap on fee and loans and grants approved.

Due to the competitive nature of obtaining RECD grants and loans, the 6.7 customers per mile does not help the chances for Kirksville Water Association to receive a RECD grant and loan.

This project being in the Cottonburg-Valley View area would be eligible for up to 75% grant and loan at the poverty rate (currently 4.5%). To obtain this rate a potential health hazard would have to be established. Water samples of existing wells and cisterns will need to be taken with results showing a potential of health hazard.

No money was shown in the budget to have someone obtain sign-ups and easements in an effort to lower expenses. If should be required of the Cuzick residents if the project is accepted, that they will be responsible for obtaining all easements and sign-ups.

Before any decision is made on this project, the 1995 audit should be reviewed and decisions made if a rate increase is needed. Any rate increase would alter the results of this feasibility study.

KIRKSVILLE WATER ASSOCIATION, INC.

First	2,000 gallons	$ 11.62	(Minimum Bill)
Next	3,000 gallons	5.56	per 1,000 gallons
Next	5,000 gallons	4.51	per 1,000 gallons
Over	10,000 gallons	3.51	per 1,000 gallons

9/94

EXHIBIT V

Letter from Madison County Health Deparment

Madison County Health Department

July 30, 1996

Mr. Kerry S. Odle, P.E.
CMW, Inc.
136 Big Hill Avenue
Richmond, KY 40475

RE: CUZICK WATER MAIN EXTENSION

Dear Mr. Odle:

I am pleased to hear that the Kirksville Water Association is applying for funding in order to install a community water line in the Cuzick area of Madison County.

It is my understanding that the population in this area now relies mainly on cisterns and dug wells for a potable water supply. Samples taken from these type sources in Madison county reveal contamination of these water supplies in a majority of the results. Access to a pure water supply will certainly remove many potential health threats from the Cuzick community.

If you should have any questions or if I could be of further assistance to you, please contact me at 624-2284.

Sincerely,

Carl Noe R.S.

Carl Noe, R.S.
Environmental Supervisor

CN/ks

214 Boggs Lane • P.O. Box 906 • Richmond, KY 40476-0906 • (606) 623-7312 • FAX (606) 623-5910

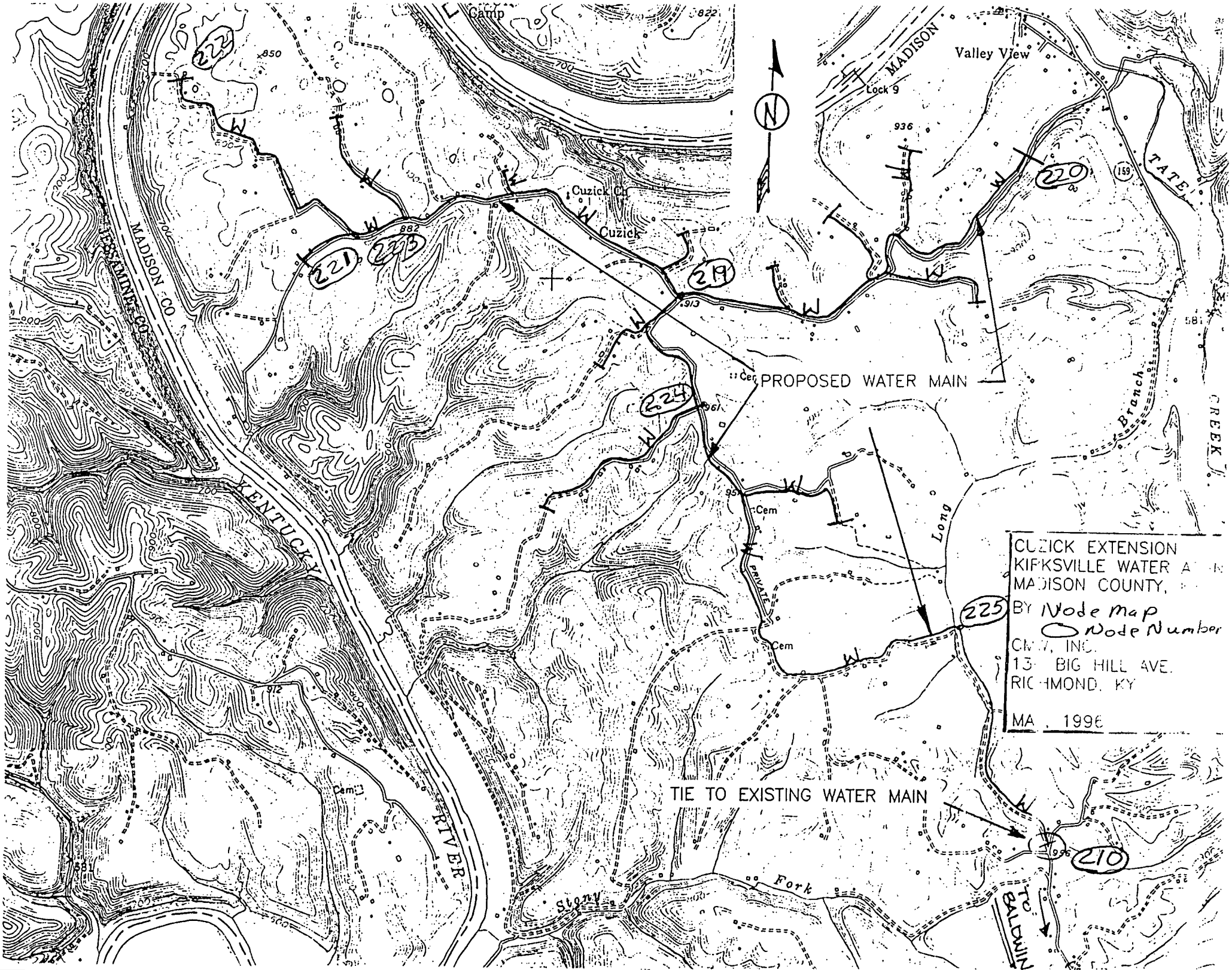
EXHIBIT VI

Computer Generated Hydraulic Analysis with
Distribution System Map

Kirksville Water Association

Hydraulic Analysis
(Includes proposed Cuzick lines)

1. Node Map for Cuzick
2. Summary of Input
3. Peak Demand - Pumps Off
4. Peak Demand - Pump #1 On, Pump #2 Off
5. Peak Demand - Pumps #1 & #2 On
6. Peak Demand - Pump #1 Off, Pump #2 On
7. Normal Demand - Pumps Off


PROPOSED WATER MAIN
TIE TO EXISTING WATER MAIN
CUZICK EXTENSION
KIRKSVILLE WATER A
MADISON COUNTY,
BY Node Map
Node Number
CIVIL, INC.
13 BIG HILL AVE.
RICHMOND, KY
MA , 1996
MADISON CO
JESSAMINE CO
KENTUCKY RIVER
Cuzick Cr
Cuzick
Valley View
Lock 9
Camp
Long Branch
Stony Fork
TATE CREEK
TO BALDWIN
PRIVATE
Cem
219
220
221
222
223
224
225
210

```
        * * * * * * * * * * * K Y P I P E 3 * * * * * * * * * * *
        *   University of Kentucky Hydraulic Analysis Program    *
        * Distribution of Pressure and Flows in Piping Networks *
        *         2000 PIPE VERSION - 1.00   (09/28/95)         *
        * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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DATE: 06/12/97
TIME: 13:23:06.95

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TABULATED OUTPUT FILENAME ------- C:\KY3\DATA\KIRKS94.OUT
POSTPROCESSOR RESULTS FILENAME --- C:\KY3\DATA\KIRKS94.RES

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

R E G U L A T I N G V A L V E D A T A

RV LABEL	VALVE TYPE	POSITION JUNCTION	CONTROLLED PIPE	VALVE SETTING (ft or gpm)
R1	PRV-1	70	67	835.38
R2	PRV-1	101	82	916.00

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE NOS. #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	PUMP LABEL	MINOR LOSS COEFF.	FGN-HGL (ft)
1-FG	AA	200	1500.0	6.0	140.00		0.00	1086.00
2	2	51	440.0	6.0	140.00		0.00	
3-CV	51	52	5.0	6.0	140.00		0.00	
4-XXPU	51	52	5.0	6.0	140.00	P1	0.00	
5	52	3	7055.0	6.0	140.00		0.00	
6	3	4	3970.0	6.0	140.00		0.00	
7	4	5	2800.0	6.0	140.00		0.00	
8	5	6	5000.0	4.0	140.00		0.00	
9	5	7	5500.0	6.0	140.00		0.00	
10	7	8	2800.0	6.0	140.00		0.00	
11	4	9	3830.0	6.0	140.00		0.00	
12	9	10	5500.0	6.0	140.00		0.00	
13	10	94	3490.0	6.0	140.00		0.00	
14	94	95	10.0	6.0	140.00		0.00	
15-XX	94	95	10.0	6.0	140.00		0.00	
16	95	96	1249.0	6.0	140.00		0.00	
17	96	97	5.0	6.0	140.00		0.00	
18-CV	96	97	5.0	6.0	140.00		0.00	
19	97	11	845.0	6.0	140.00		0.00	
20	11	110	10920.0	6.0	140.00		0.00	
21	12	13	1325.0	6.0	140.00		0.00	
22	13	14	2000.0	3.0	140.00		0.00	
23	13	15	11950.0	4.0	140.00		0.00	
24	12	16	7300.0	6.0	140.00		0.00	
25	16	17	10800.0	4.0	140.00		0.00	
26	17	214	4450.0	4.0	140.00		0.00	
27	18	19	12300.0	4.0	140.00		0.00	
28	19	20	3700.0	4.0	140.00		0.00	
29	20	21	8700.0	4.0	140.00		0.00	
30	21	22	1000.0	4.0	140.00		0.00	
31	17	23	5000.0	4.0	140.00		0.00	
32	16	24	2960.0	3.0	140.00		0.00	
33	16	25	2600.0	6.0	140.00		0.00	
34	25	26	1300.0	4.0	140.00		0.00	
35	25	42	1000.0	6.0	140.00		0.00	
36	27	28	7400.0	3.0	140.00		0.00	
37	27	29	3670.0	6.0	140.00		0.00	
38	29	30	5500.0	3.0	140.00		0.00	
39	29	31	7000.0	6.0	140.00		0.00	
40	31	32	4000.0	6.0	140.00		0.00	
41	32	33	7150.0	6.0	140.00		0.00	
42	32	34	4150.0	4.0	140.00		0.00	
43	34	35	5700.0	4.0	140.00		0.00	

44	35	36	10550.0	4.0	140.00		0.00	
45	36	37	15800.0	4.0	140.00		0.00	
46	37	38	8220.0	4.0	140.00		0.00	
47	38	39	3300.0	3.0	140.00		0.00	
48	39	40	2350.0	3.0	140.00		0.00	
49	39	41	4900.0	3.0	140.00		0.00	
50	27	42	4000.0	4.0	140.00		0.00	
51	42	43	70.0	4.0	140.00		0.00	
52	43	99	111.7	6.0	140.00		0.00	
53-FG	99	BB	1.0	12.0	140.00		0.00	1140.00
54	27	44	7115.0	6.0	140.00		0.00	
55	44	45	7910.0	6.0	140.00		0.00	
56	45	46	3650.0	6.0	140.00		0.00	
57	46	33	3750.0	6.0	140.00		0.00	
58	45	47	8220.0	6.0	140.00		0.00	
59	47	211	6300.0	4.0	140.00		0.00	
60	47	48	2700.0	4.0	140.00		0.00	
61	4	49	2000.0	6.0	140.00		0.00	
62	9	50	6625.0	6.0	140.00		0.00	
63	22	102	1500.0	3.0	140.00		0.00	
64	102	75	3600.0	4.0	140.00		0.00	
65	75	73	1800.0	4.0	140.00		0.00	
66	73	70	1050.0	4.0	140.00		0.00	
67-RV	70	100	1.0	4.0	140.00		0.00	
68-XX	70	100	1.0	4.0	140.00		0.00	
69	100	72	3599.0	4.0	140.00		0.00	
70	8	80	8750.0	6.0	140.00		0.00	
71	80	81	1375.0	6.0	140.00		0.00	
72	81	83	1550.0	6.0	140.00		0.00	
73	82	83	100.0	6.0	140.00		0.00	
74-FG	CC	98	1.0	12.0	140.00		0.00	1138.00
75	98	82	134.9	6.0	140.00		0.00	
76	83	84	5575.0	4.0	140.00		0.00	
77	84	85	3775.0	4.0	140.00		0.00	
78	85	86	2470.0	4.0	140.00		0.00	
79	80	87	4312.0	6.0	140.00		0.00	
80	81	88	1800.0	6.0	140.00		0.00	
81	88	101	1500.0	4.0	140.00		0.00	
82-RV	101	103	10.0	4.0	140.00		0.00	
83-XX	101	103	10.0	4.0	140.00		0.00	
84	103	89	5350.0	4.0	140.00		0.00	
85	88	90	1650.0	4.0	140.00		0.00	
86	90	91	5300.0	4.0	140.00		0.00	
87-XXPU	110	12	50.0	6.0	140.00	P2	0.00	
88-CV	110	12	50.0	6.0	140.00		0.00	
89	200	2	500.0	6.0	140.00		0.00	
90	84	201	1650.0	4.0	150.00		0.00	

91	201	202	4050.0	4.0	150.00	0.00
92	202	203	2000.0	4.0	150.00	0.00
93	203	204	10815.0	4.0	150.00	0.00
94	204	205	4050.0	4.0	150.00	0.00
95	204	206	2200.0	4.0	150.00	0.00
96	203	208	900.0	4.0	150.00	0.00
97	204	207	2485.0	4.0	150.00	0.00
98	208	209	1584.0	4.0	150.00	0.00
99	208	210	3600.0	4.0	150.00	0.00
100	211	38	2430.0	4.0	150.00	0.00
101	15	212	3500.0	6.0	150.00	0.00
102	213	48	3960.0	4.0	150.00	0.00
103	214	18	3050.0	4.0	150.00	0.00
104	214	215	5610.0	4.0	150.00	0.00
105	19	218	4520.0	4.0	150.00	0.00
106	46	216	3000.0	4.0	150.00	0.00
107	216	217	3440.0	4.0	150.00	0.00
108	212	213	2300.0	6.0	150.00	0.00
109-CV	15	50	2800.0	6.0	150.00	0.00
110	210	225	4600.0	4.0	150.00	0.00
111	225	224	9500.0	4.0	150.00	0.00
112	224	219	2900.0	4.0	150.00	0.00
113	219	220	7700.0	4.0	150.00	0.00
114	219	223	6900.0	4.0	150.00	0.00
115	223	221	1200.0	4.0	150.00	0.00
116	223	222	5200.0	4.0	150.00	0.00

P U M P D A T A

THERE IS A PUMP ID NO. 1 IN THE FOLLOWING PIPES:
4

DESCRIBED BY THE FOLLOWING DATA:

HEAD (ft)	FLOWRATE (gpm)
128.00	0.00
88.00	360.00
50.00	460.00

THERE IS A PUMP ID NO. 2 IN THE FOLLOWING PIPES:
87

DESCRIBED BY THE FOLLOWING DATA:
HEAD FLOWRATE

(ft)	(gpm)
138.00	0.00
117.00	278.00
64.00	450.00

JUNCTION NODE DATA

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	CONNECTING PIPES			
2		0.00	980.00	2	89		
3		3.36	985.00	5	6		
4		15.54	970.00	6	7	11	61
5		7.98	979.00	7	8	9	
6		2.94	810.00	8			
7		13.86	962.00	9	10		
8		5.04	963.00	10	70		
9		41.61	960.00	11	12	62	
10		19.74	924.00	12	13		
11		2.10	710.00	19	20		
12		5.04	948.00	21	24	87	88
13		3.36	880.00	21	22	23	
14		0.84	905.00	22			
15		2.10	795.00	23	101	109	
16		19.74	980.00	24	25	32	33
17		11.34	974.00	25	26	31	
18		4.20	960.00	27	103		
19		4.20	962.00	27	28	105	
20		4.20	943.00	28	29		
21		4.20	966.00	29	30		
22		4.20	960.00	30	63		
23		1.26	954.00	31			
24		2.52	964.00	32			
25		7.98	973.00	33	34	35	
26		5.46	970.00	34			
27		13.86	990.00	36	37	50	54
28		2.10	780.00	36			
29		3.78	960.00	37	38	39	
30		1.68	960.00	38			
31		3.36	941.00	39	40		
32		5.04	984.00	40	41	42	
33		2.94	805.00	41	57		

34	1.26	900.00	42	43	
35	4.62	960.00	43	44	
36	5.04	880.00	44	45	
37	4.62	845.00	45	46	
38	7.56	950.00	46	47	100
39	2.52	927.00	47	48	49
40	2.10	965.00	48		
41	2.10	905.00	49		
42	14.28	995.00	35	50	51
43	0.00	1007.00	51	52	
44	5.04	788.00	54	55	
45	10.08	984.00	55	56	58
46	5.04	967.00	56	57	106
47	12.60	992.00	58	59	60
48	6.30	990.00	60	102	
49	23.94	900.00	61		
50	35.70	960.00	62	109	
51	0.00	978.00	2	3	4
52	0.00	978.00	3	4	5
70	7.56	720.00	66	67	68
72	3.36	567.00	69		
73	3.36	795.00	65	66	
75	3.36	795.00	64	65	
80	12.60	972.00	70	71	79
81	5.04	966.00	71	72	80
82	0.00	978.57	73	75	
83	0.00	975.57	72	73	76
84	1.68	956.00	76	77	90
85	3.36	942.00	77	78	
86	2.10	930.00	78		
87	1.26	970.00	79		
88	2.94	961.00	80	81	85
89	1.26	717.00	84		
90	14.62	963.00	85	86	
91	0.84	938.00	86		
94	0.00	800.00	13	14	15
95	0.00	800.00	14	15	16
96	0.00	700.00	16	17	18
97	0.00	700.00	17	18	19
98	0.00	1114.50	74	75	
99	0.00	1118.70	52	53	
100	0.00	720.00	67	68	69
101	0.00	846.00	81	82	83
102	0.00	880.00	63	64	
103	0.00	846.00	82	83	84
110	0.00	948.00	20	87	88
200	0.00	980.00	1	89	

201		0.78	755.00	90	91		
202		0.78	980.00	91	92		
203		5.64	960.00	92	93	96	
204		3.15	965.00	93	94	95	97
205		2.34	720.00	94			
206		2.52	920.00	95			
207		0.57	920.00	97			
208		7.62	850.00	96	98	99	
209		2.73	945.00	98			
210		2.73	956.00	99	110		
211		0.80	1010.00	59	100		
212		0.13	1000.00	101	108		
213		0.39	920.00	102	108		
214	TURNER RIDGE	0.46	968.00	26	103	104	
215	" "	0.46	970.00	104			
216	PEYTONTOWN	0.46	850.00	106	107		
217	MORGAN SUMMI	0.46	850.00	107			
218	BURTON LANE	0.46	950.00	105			
219	CUZICK	14.43	913.00	112	113	114	
220	CUZICK	3.90	720.00	113			
221	CUZICK	0.78	820.00	115			
222	CUZICK	3.12	780.00	116			
223	CUZICK	3.51	880.00	114	115	116	
224	CUZICK	1.56	961.00	111	112		
225	CUZICK	0.78	760.00	110	111		

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 116
NUMBER OF JUNCTION NODES .....(j) = 104
NUMBER OF PRIMARY LOOPS .....(l) = 10
NUMBER OF FIXED GRADE NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

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S I M U L A T I O N R E S U L T S
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THE RESULTS ARE OBTAINED AFTER 9 TRIALS WITH AN ACCURACY = 0.00058
THE REGULATING VALVES REQUIRED 1 ADJUSTMENTS

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

KIRKSVILLE WATER ASSOCIATION
PEAK DEMANDS-PROPOSED PUMPS 1 AND 2 OFF TANKS HALF FULL
EXISTING SYSTEM DEMANDS SHOWN=NORMAL X 3 trial line 214 to 215 to11

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS. #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	PUMP LABEL	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
1-FG	AA	200	0.00	0.00	0.00		0.00	0.00	0.0(
2	2	51	0.00	0.00	0.00		0.00	0.00	0.0(
3-XXCV	51	52							
4-XXPU	51	52							
5	52	3	0.00	0.00	0.00		0.00	0.00	0.0(
6	3	4	-3.36	0.01	0.00		0.00	0.04	0.0(
7	4	5	-96.95	2.40	0.00		0.00	1.10	0.8
8	5	6	2.94	0.05	0.00		0.00	0.08	0.0
9	5	7	-107.87	5.75	0.00		0.00	1.22	1.0
10	7	8	-121.73	3.66	0.00		0.00	1.38	1.3
11	4	9	54.11	1.12	0.00		0.00	0.61	0.2
12	9	10	21.84	0.30	0.00		0.00	0.25	0.0
13	10	94	2.10	0.00	0.00		0.00	0.02	0.0
14	94	95	2.10	0.00	0.00		0.00	0.02	0.0
15-XX	94	95							
16	95	96	2.10	0.00	0.00		0.00	0.02	0.0
17	96	97	0.68	0.00	0.00		0.00	0.01	0.0
18-CV	96	97	1.42	0.00	0.00		0.00	0.02	0.0

19	97	11	2.10	0.00	0.00	0.00	0.02	0.00
20	11	110	0.00	0.00	0.00	0.00	0.00	0.00
21	12	13	53.93	0.38	0.00	0.00	0.61	0.29
22	13	14	0.84	0.01	0.00	0.00	0.04	0.00
23	13	15	49.73	21.46	0.00	0.00	1.27	1.80
24	12	16	-58.97	2.49	0.00	0.00	0.67	0.34
25	16	17	52.62	21.53	0.00	0.00	1.34	1.99
26	17	214	40.02	5.34	0.00	0.00	1.02	1.20
27	18	19	34.90	11.46	0.00	0.00	0.89	0.93
28	19	20	30.24	2.64	0.00	0.00	0.77	0.71
29	20	21	26.04	4.71	0.00	0.00	0.66	0.54
30	21	22	21.84	0.39	0.00	0.00	0.56	0.39
31	17	23	1.26	0.01	0.00	0.00	0.03	0.00
32	16	24	2.52	0.09	0.00	0.00	0.11	0.03
33	16	25	-133.85	4.06	0.00	0.00	1.52	1.56
34	25	26	5.46	0.04	0.00	0.00	0.14	0.03
35	25	42	-147.29	1.86	0.00	0.00	1.67	1.86
36	27	28	2.10	0.15	0.00	0.00	0.10	0.02
37	27	29	42.99	0.70	0.00	0.00	0.49	0.19
38	29	30	1.68	0.08	0.00	0.00	0.08	0.03
39	29	31	37.53	1.04	0.00	0.00	0.43	0.15
40	31	32	34.17	0.50	0.00	0.00	0.39	0.12
41	32	33	14.05	0.17	0.00	0.00	0.16	0.02
42	32	34	15.07	0.82	0.00	0.00	0.38	0.20
43	34	35	13.81	0.95	0.00	0.00	0.35	0.17
44	35	36	9.19	0.83	0.00	0.00	0.23	0.0
45	36	37	4.15	0.29	0.00	0.00	0.11	0.0
46	37	38	-0.47	0.00	0.00	0.00	0.01	0.0
47	38	39	6.72	0.59	0.00	0.00	0.30	0.1
48	39	40	2.10	0.05	0.00	0.00	0.10	0.0
49	39	41	2.10	0.10	0.00	0.00	0.10	0.0
50	27	42	-101.30	26.82	0.00	0.00	2.59	6.7
51	42	43	-262.86	2.75	0.00	0.00	6.71	39.2
52	43	99	-262.86	0.61	0.00	0.00	2.98	5.4
53-FG	99	BB	-262.86	0.00	0.00	0.00	0.75	0.1
54	27	44	42.35	1.32	0.00	0.00	0.48	0.1
55	44	45	37.31	1.16	0.00	0.00	0.42	0.1
56	45	46	-5.15	0.01	0.00	0.00	0.06	0.0
57	46	33	-11.11	0.06	0.00	0.00	0.13	0.0
58	45	47	32.38	0.93	0.00	0.00	0.37	0.3
59	47	211	15.55	1.31	0.00	0.00	0.40	0.2
60	47	48	4.24	0.05	0.00	0.00	0.11	0.0
61	4	49	23.94	0.13	0.00	0.00	0.27	0.0
62	9	50	-9.34	0.07	0.00	0.00	0.11	0.0
63	22	102	17.64	1.60	0.00	0.00	0.80	1.0
64	102	75	17.64	0.95	0.00	0.00	0.45	0.2
65	75	73	14.28	0.32	0.00	0.00	0.36	0.1

66	73	70	10.92	0.11	0.00	0.00	0.28	0.11
67-RV	70	100	3.36	0.00	0.00	0.00	0.09	0.01
68-XX	70	100						
69	100	72	3.36	0.04	0.00	0.00	0.09	0.01
70	8	80	-126.77	12.34	0.00	0.00	1.44	1.41
71	80	81	-140.63	2.35	0.00	0.00	1.60	1.71
72	81	83	-165.33	3.57	0.00	0.00	1.88	2.31
73	82	83	229.41	0.42	0.00	0.00	2.60	4.23
74-FG	CC	98	229.41	0.00	0.00	0.00	0.65	0.14
75	98	82	229.41	0.57	0.00	0.00	2.60	4.23
76	83	84	64.08	16.01	0.00	0.00	1.64	2.87
77	84	85	5.46	0.11	0.00	0.00	0.14	0.03
78	85	86	2.10	0.01	0.00	0.00	0.05	0.01
79	80	87	1.26	0.00	0.00	0.00	0.01	0.00
80	81	88	19.66	0.08	0.00	0.00	0.22	0.04
81	88	101	1.26	0.00	0.00	0.00	0.03	0.00
82-RV	101	103	1.26	0.00	0.00	0.00	0.03	0.00
83-XX	101	103						
84	103	89	1.26	0.01	0.00	0.00	0.03	0.00
85	88	90	15.46	0.34	0.00	0.00	0.39	0.21
86	90	91	0.84	0.00	0.00	0.00	0.02	0.00
87-XXPU	110	12						
88-XXCV	110	12						
89	200	2	0.00	0.00	0.00	0.00	0.00	0.00
90	84	201	56.94	3.35	0.00	0.00	1.45	2.03
91	201	202	56.16	8.02	0.00	0.00	1.43	1.98
92	202	203	55.38	3.86	0.00	0.00	1.41	1.93
93	203	204	8.58	0.66	0.00	0.00	0.22	0.06
94	204	205	2.34	0.02	0.00	0.00	0.06	0.01
95	204	206	2.52	0.01	0.00	0.00	0.06	0.01
96	203	208	41.16	1.00	0.00	0.00	1.05	1.11
97	204	207	0.57	0.00	0.00	0.00	0.01	0.00
98	208	209	2.73	0.01	0.00	0.00	0.07	0.01
99	208	210	30.81	2.34	0.00	0.00	0.79	0.65
100	211	38	14.75	0.40	0.00	0.00	0.38	0.17
101	15	212	2.58	0.00	0.00	0.00	0.03	0.00
102	213	48	2.06	0.02	0.00	0.00	0.05	0.00
103	214	18	39.10	3.09	0.00	0.00	1.00	1.01
104	214	215	0.46	0.00	0.00	0.00	0.01	0.00
105	19	218	0.46	0.00	0.00	0.00	0.01	0.00
106	46	216	0.92	0.00	0.00	0.00	0.02	0.00
107	216	217	0.46	0.00	0.00	0.00	0.01	0.00
108	212	213	2.45	0.00	0.00	0.00	0.03	0.00
109-CV	15	50	45.04	0.51	0.00	0.00	0.51	0.18
110	210	225	28.08	2.52	0.00	0.00	0.72	0.55
111	225	224	27.30	4.94	0.00	0.00	0.70	0.52
112	224	219	25.74	1.35	0.00	0.00	0.66	0.47

113	219	220	3.90	0.11	0.00	0.00	0.10	0.01
114	219	223	7.41	0.32	0.00	0.00	0.19	0.05
115	223	221	0.78	0.00	0.00	0.00	0.02	0.00
116	223	222	3.12	0.05	0.00	0.00	0.08	0.01

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
2		0.00	1086.00	980.00	106.00	45.93
3		3.36	1106.92	985.00	121.92	52.83
4		15.54	1106.92	970.00	136.92	59.33
5		7.98	1109.33	979.00	130.33	56.47
6		2.94	1109.28	810.00	299.28	129.69
7		13.86	1115.08	962.00	153.08	66.33
8		5.04	1118.74	963.00	155.74	67.49
9		41.61	1105.81	960.00	145.81	63.18
10		19.74	1105.51	924.00	181.51	78.65
11		2.10	1105.51	710.00	395.51	171.39
12		5.04	1128.23	948.00	180.23	78.10
13		3.36	1127.85	880.00	247.85	107.40
14		0.84	1127.84	905.00	222.84	96.57
15		2.10	1106.39	795.00	311.39	134.94
16		19.74	1130.73	980.00	150.73	65.32
17		11.34	1109.20	974.00	135.20	58.59
18		4.20	1100.77	960.00	140.77	61.00
19		4.20	1089.30	962.00	127.30	55.16
20		4.20	1086.66	943.00	143.66	62.25
21		4.20	1081.94	966.00	115.94	50.24
22		4.20	1081.55	960.00	121.55	52.67
23		1.26	1109.19	954.00	155.19	67.25
24		2.52	1130.64	964.00	166.64	72.21
25		7.98	1134.78	973.00	161.78	70.11
26		5.46	1134.75	970.00	164.75	71.39
27		13.86	1109.82	990.00	119.82	51.92
28		2.10	1109.67	780.00	329.67	142.86
29		3.78	1109.12	960.00	149.12	64.62
30		1.68	1109.05	960.00	149.05	64.59
31		3.36	1108.09	941.00	167.09	72.41
32		5.04	1107.59	984.00	123.59	53.56
33		2.94	1107.42	805.00	302.42	131.05
34		1.26	1106.77	900.00	206.77	89.60
35		4.62	1105.82	960.00	145.82	63.19

36	5.04	1104.99	880.00	224.99	97.49
37	4.62	1104.70	845.00	259.70	112.54
38	7.56	1104.70	950.00	154.70	67.04
39	2.52	1104.11	927.00	177.11	76.75
40	2.10	1104.07	965.00	139.07	60.26
41	2.10	1104.01	905.00	199.01	86.24
42	14.28	1136.65	995.00	141.65	61.38
43	0.00	1139.39	1007.00	132.39	57.37
44	5.04	1108.51	788.00	320.51	138.89
45	10.08	1107.35	984.00	123.35	53.45
46	5.04	1107.36	967.00	140.36	60.82
47	12.60	1106.42	992.00	114.42	49.58
48	6.30	1106.37	990.00	116.37	50.43
49	23.94	1106.80	900.00	206.80	89.61
50	35.70	1105.88	960.00	145.88	63.22
51	0.00	1086.00	978.00	108.00	46.80
52	0.00	1106.92	978.00	128.92	55.86
70	7.56	1078.57	720.00	358.57	155.38
72	3.36	835.34	567.00	268.34	116.28
73	3.36	1078.68	795.00	283.68	122.93
75	3.36	1079.00	795.00	284.00	123.07
80	12.60	1131.08	972.00	159.08	68.94
81	5.04	1133.43	966.00	167.43	72.55
82	0.00	1137.43	978.57	158.86	68.84
83	0.00	1137.01	975.57	161.44	69.96
84	1.68	1121.00	956.00	165.00	71.50
85	3.36	1120.88	942.00	178.88	77.52
86	2.10	1120.87	930.00	190.87	82.71
87	1.26	1131.08	970.00	161.08	69.80
88	2.94	1133.35	961.00	172.35	74.69
89	1.26	915.99	717.00	198.99	86.23
90	14.62	1133.01	963.00	170.01	73.67
91	0.84	1133.01	938.00	195.01	84.50
94	0.00	1105.51	800.00	305.51	132.39
95	0.00	1105.51	800.00	305.51	132.39
96	0.00	1105.51	700.00	405.51	175.72
97	0.00	1105.51	700.00	405.51	175.72
98	0.00	1138.00	1114.50	23.50	10.18
99	0.00	1140.00	1118.70	21.30	9.23
100	0.00	835.38	720.00	115.38	50.00
101	0.00	1133.35	846.00	287.35	124.52
102	0.00	1079.95	880.00	199.95	86.64
103	0.00	916.00	846.00	70.00	30.33
110	0.00	1105.51	948.00	157.51	68.25
200	0.00	1086.00	980.00	106.00	45.93
201	0.78	1117.65	755.00	362.65	157.15
202	0.78	1109.63	980.00	129.63	56.17

203		5.64	1105.77	960.00	145.77	63.17
204		3.15	1105.11	965.00	140.11	60.71
205		2.34	1105.09	720.00	385.09	166.87
206		2.52	1105.10	920.00	185.10	80.21
207		0.57	1105.11	920.00	185.11	80.21
208		7.62	1104.77	850.00	254.77	110.40
209		2.73	1104.76	945.00	159.76	69.23
210		2.73	1102.42	956.00	146.42	63.45
211		0.80	1105.11	1010.00	95.11	41.21
212		0.13	1106.39	1000.00	106.39	46.10
213		0.39	1106.39	920.00	186.39	80.77
214	TURNER RIDGE	0.46	1103.85	968.00	135.85	58.87
215	" "	0.46	1103.85	970.00	133.85	58.00
216	PEYTONTOWN	0.46	1107.36	850.00	257.36	111.52
217	MORGAN SUMMI	0.46	1107.36	850.00	257.36	111.52
218	BURTON LANE	0.46	1089.30	950.00	139.30	60.36
219	CUZICK	14.43	1093.60	913.00	180.60	78.26
220	CUZICK	3.90	1093.50	720.00	373.50	161.85
221	CUZICK	0.78	1093.28	820.00	273.28	118.42
222	CUZICK	3.12	1093.23	780.00	313.23	135.74
223	CUZICK	3.51	1093.28	880.00	213.28	92.42
224	CUZICK	1.56	1094.96	961.00	133.96	58.05
225	CUZICK	0.78	1099.90	760.00	339.90	147.29

R E G U L A T I N G V A L V E R E P O R T

RV LABEL	VALVE TYPE	POSITION NODE	CONTROLLED PIPE	VALVE SETTING (ft or gpm)	VALVE STATUS	UPSTREAM GRADE (ft)	DOWNSTREAM GRADE (ft)	THROUGH FLOW (gpm)
R1	PRV-1	70	67	835.38	THROTTLED	1078.57	835.38	3.36
R2	PRV-1	101	82	916.00	THROTTLED	1133.35	916.00	1.26

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM FIXED GRADE NODES
(-) OUTFLOWS FROM THE SYSTEM INTO FIXED GRADE NODES

NODE LABEL	PIPE NUMBER	FLOWRATE (gpm)	NODE TITLE
AA	1	0.00	
BB	53	262.86	

CC	74	229.41

NET SYSTEM INFLOW	=	492.27
NET SYSTEM OUTFLOW	=	0.00
NET SYSTEM DEMAND	=	492.27

C H A N G E S F O R N E X T S I M U L A T I O N

P I P E P A R A M E T E R C H A N G E S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE NOS. #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	FGN-HGL (ft)
4-PU	51	52	5.0	6.0	140.00	0.00	0.00

THE PUMP IDENTIFYING NUMBER (ID) = 1

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S I M U L A T I O N R E S U L T S
****

THE RESULTS ARE OBTAINED AFTER 8 TRIALS WITH AN ACCURACY = 0.00001
THE REGULATING VALVES REQUIRED 1 ADJUSTMENTS

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

KIRKSVILLE WATER ASSOCIATION-DEMANDS SHOWN = NORMAL X 3
PEAK DEMANDS PUMP #1 ON-PUMP #2 OFF
EXISTING SYSTEM HAGANS MILL LINE ADDED

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS. #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	PUMP LABEL	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)

1-FG	AA	200	234.43	6.61	0.00		0.00	2.66	4.40
2	2	51	234.43	1.94	0.00		0.00	2.66	4.40
3-XXCV	51	52							
4-PU	51	52	234.43	0.02	115.57	P1	0.00	2.66	4.40
5	52	3	234.43	31.07	0.00		0.00	2.66	4.40
6	3	4	231.07	17.02	0.00		0.00	2.62	4.29
7	4	5	67.07	1.21	0.00		0.00	0.76	0.43
8	5	6	2.94	0.05	0.00		0.00	0.08	0.01
9	5	7	56.15	1.72	0.00		0.00	0.64	0.31
10	7	8	42.29	0.52	0.00		0.00	0.48	0.18
11	4	9	124.52	5.23	0.00		0.00	1.41	1.36
12	9	10	47.21	1.25	0.00		0.00	0.54	0.23
13	10	94	27.47	0.29	0.00		0.00	0.31	0.08
14	94	95	27.47	0.00	0.00		0.00	0.31	0.08
15-XX	94	95							
16	95	96	27.47	0.10	0.00		0.00	0.31	0.08
17	96	97	13.74	0.00	0.00		0.00	0.16	0.02
18-CV	96	97	13.74	0.00	0.00		0.00	0.16	0.02
19	97	11	27.47	0.07	0.00		0.00	0.31	0.08
20	11	110	25.37	0.78	0.00		0.00	0.29	0.07
21	12	13	35.62	0.18	0.00		0.00	0.40	0.13
22	13	14	0.84	0.01	0.00		0.00	0.04	0.00
23	13	15	31.42	9.17	0.00		0.00	0.80	0.77
24	12	16	-15.29	0.20	0.00		0.00	0.17	0.03
25	16	17	52.62	21.53	0.00		0.00	1.34	1.99
26	17	214	40.02	5.34	0.00		0.00	1.02	1.20
27	18	19	34.90	11.46	0.00		0.00	0.89	0.93
28	19	20	30.24	2.64	0.00		0.00	0.77	0.71
29	20	21	26.04	4.71	0.00		0.00	0.66	0.54
30	21	22	21.84	0.39	0.00		0.00	0.56	0.39
31	17	23	1.26	0.01	0.00		0.00	0.03	0.00
32	16	24	2.52	0.09	0.00		0.00	0.11	0.03
33	16	25	-90.17	1.95	0.00		0.00	1.02	0.75
34	25	26	5.46	0.04	0.00		0.00	0.14	0.03
35	25	42	-103.61	0.97	0.00		0.00	1.18	0.97
36	27	28	2.10	0.15	0.00		0.00	0.10	0.02
37	27	29	30.64	0.37	0.00		0.00	0.35	0.10
38	29	30	1.68	0.08	0.00		0.00	0.08	0.01
39	29	31	25.18	0.49	0.00		0.00	0.29	0.07
40	31	32	21.82	0.22	0.00		0.00	0.25	0.05
41	32	33	3.26	0.01	0.00		0.00	0.04	0.00
42	32	34	13.52	0.67	0.00		0.00	0.35	0.16
43	34	35	12.26	0.77	0.00		0.00	0.31	0.13
44	35	36	7.64	0.59	0.00		0.00	0.20	0.06
45	36	37	2.60	0.12	0.00		0.00	0.07	0.01
46	37	38	-2.02	0.04	0.00		0.00	0.05	0.00
47	38	39	6.72	0.59	0.00		0.00	0.30	0.18

48	39	40	2.10	0.05	0.00	0.00	0.10	0.02
49	39	41	2.10	0.10	0.00	0.00	0.10	0.02
50	27	42	-74.56	15.21	0.00	0.00	1.90	3.80
51	42	43	-192.45	1.54	0.00	0.00	4.91	22.01
52	43	99	-192.45	0.34	0.00	0.00	2.18	3.06
53-FG	99	BB	-192.45	0.00	0.00	0.00	0.55	0.10
54	27	44	27.96	0.61	0.00	0.00	0.32	0.09
55	44	45	22.92	0.47	0.00	0.00	0.26	0.06
56	45	46	5.64	0.02	0.00	0.00	0.06	0.00
57	46	33	-0.32	0.00	0.00	0.00	0.00	0.00
58	45	47	7.20	0.06	0.00	0.00	0.08	0.01
59	47	211	17.10	1.57	0.00	0.00	0.44	0.25
60	47	48	-22.50	1.12	0.00	0.00	0.57	0.41
61	4	49	23.94	0.13	0.00	0.00	0.27	0.06
62	9	50	35.70	0.89	0.00	0.00	0.41	0.13
63	22	102	17.64	1.60	0.00	0.00	0.80	1.07
64	102	75	17.64	0.95	0.00	0.00	0.45	0.26
65	75	73	14.28	0.32	0.00	0.00	0.36	0.18
66	73	70	10.92	0.11	0.00	0.00	0.28	0.11
67-RV	70	100	3.36	0.00	0.00	0.00	0.09	0.01
68-XX	70	100						
69	100	72	3.36	0.04	0.00	0.00	0.09	0.01
70	8	80	37.25	1.28	0.00	0.00	0.42	0.15
71	80	81	23.39	0.08	0.00	0.00	0.27	0.06
72	81	83	-1.31	0.00	0.00	0.00	0.01	0.00
73	82	83	65.39	0.04	0.00	0.00	0.74	0.41
74-FG	CC	98	65.39	0.00	0.00	0.00	0.19	0.01
75	98	82	65.39	0.06	0.00	0.00	0.74	0.41
76	83	84	64.08	16.01	0.00	0.00	1.64	2.87
77	84	85	5.46	0.11	0.00	0.00	0.14	0.03
78	85	86	2.10	0.01	0.00	0.00	0.05	0.01
79	80	87	1.26	0.00	0.00	0.00	0.01	0.00
80	81	88	19.66	0.08	0.00	0.00	0.22	0.04
81	88	101	1.26	0.00	0.00	0.00	0.03	0.00
82-RV	101	103	1.26	0.00	0.00	0.00	0.03	0.00
83-XX	101	103						
84	103	89	1.26	0.01	0.00	0.00	0.03	0.00
85	88	90	15.46	0.34	0.00	0.00	0.39	0.21
86	90	91	0.84	0.00	0.00	0.00	0.02	0.00
87-XXPU	110	12						
88-CV	110	12	25.37	0.00	0.00	0.00	0.29	0.07
89	200	2	234.43	2.20	0.00	0.00	2.66	4.40
90	84	201	56.94	3.35	0.00	0.00	1.45	2.03
91	201	202	56.16	8.02	0.00	0.00	1.43	1.98
92	202	203	55.38	3.86	0.00	0.00	1.41	1.93
93	203	204	8.58	0.66	0.00	0.00	0.22	0.06
94	204	205	2.34	0.02	0.00	0.00	0.06	0.01

95	204	206	2.52	0.01	0.00	0.00	0.06	0.01
96	203	208	41.16	1.00	0.00	0.00	1.05	1.11
97	204	207	0.57	0.00	0.00	0.00	0.01	0.00
98	208	209	2.73	0.01	0.00	0.00	0.07	0.01
99	208	210	30.81	2.34	0.00	0.00	0.79	0.65
100	211	38	16.30	0.49	0.00	0.00	0.42	0.20
101	15	212	29.32	0.29	0.00	0.00	0.33	0.08
102	213	48	28.80	2.28	0.00	0.00	0.74	0.57
103	214	18	39.10	3.09	0.00	0.00	1.00	1.01
104	214	215	0.46	0.00	0.00	0.00	0.01	0.00
105	19	218	0.46	0.00	0.00	0.00	0.01	0.00
106	46	216	0.92	0.00	0.00	0.00	0.02	0.00
107	216	217	0.46	0.00	0.00	0.00	0.01	0.00
108	212	213	29.19	0.19	0.00	0.00	0.33	0.08
109-XXCV	15	50						
110	210	225	28.08	2.52	0.00	0.00	0.72	0.55
111	225	224	27.30	4.94	0.00	0.00	0.70	0.52
112	224	219	25.74	1.35	0.00	0.00	0.66	0.47
113	219	220	3.90	0.11	0.00	0.00	0.10	0.01
114	219	223	7.41	0.32	0.00	0.00	0.19	0.05
115	223	221	0.78	0.00	0.00	0.00	0.02	0.00
116	223	222	3.12	0.05	0.00	0.00	0.08	0.01

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
2		0.00	1077.19	980.00	97.19	42.12
3		3.36	1159.73	985.00	174.73	75.72
4		15.54	1142.71	970.00	172.71	74.84
5		7.98	1141.50	979.00	162.50	70.42
6		2.94	1141.45	810.00	331.45	143.63
7		13.86	1139.78	962.00	177.78	77.04
8		5.04	1139.26	963.00	176.26	76.38
9		41.61	1137.49	960.00	177.49	76.91
10		19.74	1136.24	924.00	212.24	91.97
11		2.10	1135.78	710.00	425.78	184.50
12		5.04	1134.99	948.00	186.99	81.03
13		3.36	1134.81	880.00	254.81	110.42
14		0.84	1134.81	905.00	229.81	99.58
15		2.10	1125.64	795.00	330.64	143.28
16		19.74	1135.20	980.00	155.20	67.25
17		11.34	1113.66	974.00	139.66	60.52

18	4.20	1105.23	960.00	145.23	62.93
19	4.20	1093.77	962.00	131.77	57.10
20	4.20	1091.12	943.00	148.12	64.19
21	4.20	1086.41	966.00	120.41	52.18
22	4.20	1086.02	960.00	126.02	54.61
23	1.26	1113.65	954.00	159.65	69.18
24	2.52	1135.11	964.00	171.11	74.15
25	7.98	1137.15	973.00	164.15	71.13
26	5.46	1137.11	970.00	167.11	72.41
27	13.86	1122.91	990.00	132.91	57.59
28	2.10	1122.76	780.00	342.76	148.53
29	3.78	1122.54	960.00	162.54	70.43
30	1.68	1122.46	960.00	162.46	70.40
31	3.36	1122.04	941.00	181.04	78.45
32	5.04	1121.83	984.00	137.83	59.72
33	2.94	1121.82	805.00	316.82	137.29
34	1.26	1121.16	900.00	221.16	95.84
35	4.62	1120.39	960.00	160.39	69.50
36	5.04	1119.80	880.00	239.80	103.91
37	4.62	1119.68	845.00	274.68	119.03
38	7.56	1119.72	950.00	169.72	73.55
39	2.52	1119.13	927.00	192.13	83.26
40	2.10	1119.08	965.00	154.08	66.77
41	2.10	1119.03	905.00	214.03	92.75
42	14.28	1138.12	995.00	143.12	62.02
43	0.00	1139.66	1007.00	132.66	57.49
44	5.04	1122.30	788.00	334.30	144.86
45	10.08	1121.83	984.00	137.83	59.73
46	5.04	1121.82	967.00	154.82	67.09
47	12.60	1121.77	992.00	129.77	56.24
48	6.30	1122.89	990.00	132.89	57.59
49	23.94	1142.58	900.00	242.58	105.12
50	35.70	1136.59	960.00	176.59	76.52
51	0.00	1075.26	978.00	97.26	42.14
52	0.00	1190.80	978.00	212.80	92.21
70	7.56	1083.03	720.00	363.03	157.31
72	3.36	835.34	567.00	268.34	116.28
73	3.36	1083.15	795.00	288.15	124.86
75	3.36	1083.47	795.00	288.47	125.00
80	12.60	1137.99	972.00	165.99	71.93
81	5.04	1137.90	966.00	171.90	74.49
82	0.00	1137.94	978.57	159.37	69.06
83	0.00	1137.90	975.57	162.33	70.34
84	1.68	1121.89	956.00	165.89	71.89
85	3.36	1121.78	942.00	179.78	77.90
86	2.10	1121.77	930.00	191.77	83.10
87	1.26	1137.99	970.00	167.99	72.79

88		2.94	1137.82	961.00	176.82	76.62
89		1.26	915.99	717.00	198.99	86.23
90		14.62	1137.48	963.00	174.48	75.61
91		0.84	1137.48	938.00	199.48	86.44
94		0.00	1135.95	800.00	335.95	145.58
95		0.00	1135.95	800.00	335.95	145.58
96		0.00	1135.85	700.00	435.85	188.87
97		0.00	1135.85	700.00	435.85	188.87
98		0.00	1138.00	1114.50	23.50	10.18
99		0.00	1140.00	1118.70	21.30	9.23
100		0.00	835.38	720.00	115.38	50.00
101		0.00	1137.82	846.00	291.82	126.45
102		0.00	1084.41	880.00	204.41	88.58
103		0.00	916.00	846.00	70.00	30.33
110		0.00	1134.99	948.00	186.99	81.03
200		0.00	1079.39	980.00	99.39	43.07
201		0.78	1118.54	755.00	363.54	157.53
202		0.78	1110.53	980.00	130.53	56.56
203		5.64	1106.67	960.00	146.67	63.56
204		3.15	1106.01	965.00	141.01	61.10
205		2.34	1105.99	720.00	385.99	167.26
206		2.52	1105.99	920.00	185.99	80.60
207		0.57	1106.01	920.00	186.01	80.60
208		7.62	1105.67	850.00	255.67	110.79
209		2.73	1105.65	945.00	160.65	69.62
210		2.73	1103.32	956.00	147.32	63.84
211		0.80	1120.21	1010.00	110.21	47.76
212		0.13	1125.35	1000.00	125.35	54.32
213		0.39	1125.17	920.00	205.17	88.91
214	TURNER RIDGE	0.46	1108.32	968.00	140.32	60.80
215	" "	0.46	1108.32	970.00	138.32	59.94
216	PEYTONTOWN	0.46	1121.81	850.00	271.81	117.79
217	MORGAN SUMMI	0.46	1121.81	850.00	271.81	117.78
218	BURTON LANE	0.46	1093.77	950.00	143.77	62.30
219	CUZICK	14.43	1094.50	913.00	181.50	78.65
220	CUZICK	3.90	1094.39	720.00	374.39	162.24
221	CUZICK	0.78	1094.18	820.00	274.18	118.81
222	CUZICK	3.12	1094.13	780.00	314.13	136.12
223	CUZICK	3.51	1094.18	880.00	214.18	92.81
224	CUZICK	1.56	1095.85	961.00	134.85	58.44
225	CUZICK	0.78	1100.80	760.00	340.80	147.68

R E G U L A T I N G V A L V E R E P O R T

RV	VALVE POSITION	CONTROLLED VALVE	VALVE	UPSTREAM	DOWNSTREAM	THROUGH

LABEL	TYPE	NODE	PIPE	SETTING (ft or gpm)	STATUS	GRADE (ft)	GRADE (ft)	FLOW (gpm)
R1	PRV-1	70	67	835.38	THROTTLED	1083.03	835.38	3.36
R2	PRV-1	101	82	916.00	THROTTLED	1137.82	916.00	1.26

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM FIXED GRADE NODES
(-) OUTFLOWS FROM THE SYSTEM INTO FIXED GRADE NODES

NODE LABEL	PIPE NUMBER	FLOWRATE (gpm)	NODE TITLE
AA	1	234.43	
BB	53	192.45	
CC	74	65.39	

NET SYSTEM INFLOW = 492.27
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 492.27

C H A N G E S F O R N E X T S I M U L A T I O N

P I P E P A R A M E T E R C H A N G E S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE NOS. #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	FGN-HGL (ft)
87-PU	110	12	50.0	6.0	140.00	0.00	0.00

THE PUMP IDENTIFYING NUMBER (ID) = 2

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S I M U L A T I O N R E S U L T S
****

THE RESULTS ARE OBTAINED AFTER 16 TRIALS WITH AN ACCURACY = 0.00000
THE REGULATING VALVES REQUIRED 1 ADJUSTMENTS

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

KIRKSVILLE WATER ASSOCIATION-DEMANDS SHOWN = NORMAL X 3
PEAK DEMANDS PUMPS #1 AND #2 ON
EXISTING SYSTEM -HAGANS MILL LINE ADDED

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS. #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	PUMP LABEL	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)

1-FG	AA	200	256.15	7.78	0.00		0.00	2.91	5.19
2	2	51	256.15	2.28	0.00		0.00	2.91	5.19
3-XXCV	51	52							
4-PU	51	52	256.15	0.03	112.17	P1	0.00	2.91	5.19
5	52	3	256.15	36.61	0.00		0.00	2.91	5.19
6	3	4	252.79	20.10	0.00		0.00	2.87	5.06
7	4	5	-36.08	0.39	0.00		0.00	0.41	0.14
8	5	6	2.94	0.05	0.00		0.00	0.08	0.01
9	5	7	-47.00	1.24	0.00		0.00	0.53	0.22
10	7	8	-60.86	1.01	0.00		0.00	0.69	0.36
11	4	9	249.39	18.91	0.00		0.00	2.83	4.94
12	9	10	234.26	24.19	0.00		0.00	2.66	4.40
13	10	94	214.52	13.04	0.00		0.00	2.43	3.74
14	94	95	214.52	0.04	0.00		0.00	2.43	3.74
15-XX	94	95							
16	95	96	214.52	4.67	0.00		0.00	2.43	3.74
17	96	97	107.26	0.01	0.00		0.00	1.22	1.03
18-CV	96	97	107.26	0.01	0.00		0.00	1.22	1.03
19	97	11	214.52	3.16	0.00		0.00	2.43	3.74
20	11	110	212.42	40.06	0.00		0.00	2.41	3.67
21	12	13	73.94	0.69	0.00		0.00	0.84	0.52
22	13	14	0.84	0.01	0.00		0.00	0.04	0.00
23	13	15	69.74	40.14	0.00		0.00	1.78	3.36
24	12	16	133.45	11.32	0.00		0.00	1.51	1.55
25	16	17	52.62	21.53	0.00		0.00	1.34	1.99
26	17	214	40.02	5.34	0.00		0.00	1.02	1.20
27	18	19	34.90	11.46	0.00		0.00	0.89	0.93
28	19	20	30.24	2.64	0.00		0.00	0.77	0.71
29	20	21	26.04	4.71	0.00		0.00	0.66	0.54
30	21	22	21.84	0.39	0.00		0.00	0.56	0.39
31	17	23	1.26	0.01	0.00		0.00	0.03	0.00
32	16	24	2.52	0.09	0.00		0.00	0.11	0.03
33	16	25	58.57	0.88	0.00		0.00	0.66	0.34
34	25	26	5.46	0.04	0.00		0.00	0.14	0.03
35	25	42	45.13	0.21	0.00		0.00	0.51	0.21
36	27	28	2.10	0.15	0.00		0.00	0.10	0.02
37	27	29	41.68	0.66	0.00		0.00	0.47	0.18
38	29	30	1.68	0.08	0.00		0.00	0.08	0.01
39	29	31	36.22	0.97	0.00		0.00	0.41	0.14
40	31	32	32.86	0.46	0.00		0.00	0.37	0.12
41	32	33	12.98	0.15	0.00		0.00	0.15	0.02
42	32	34	14.84	0.79	0.00		0.00	0.38	0.19
43	34	35	13.58	0.92	0.00		0.00	0.35	0.16
44	35	36	8.96	0.79	0.00		0.00	0.23	0.08
45	36	37	3.92	0.26	0.00		0.00	0.10	0.02
46	37	38	-0.70	0.01	0.00		0.00	0.02	0.00
47	38	39	6.72	0.59	0.00		0.00	0.30	0.18

48	39	40	2.10	0.05	0.00	0.00	0.10	0.02
49	39	41	2.10	0.10	0.00	0.00	0.10	0.02
50	27	42	-98.42	25.43	0.00	0.00	2.51	6.36
51	42	43	-67.58	0.22	0.00	0.00	1.73	3.17
52	43	99	-67.58	0.05	0.00	0.00	0.77	0.44
53-FG	99	BB	-67.58	0.00	0.00	0.00	0.19	0.02
54	27	44	40.78	1.23	0.00	0.00	0.46	0.17
55	44	45	35.74	1.07	0.00	0.00	0.41	0.14
56	45	46	-4.08	0.01	0.00	0.00	0.05	0.00
57	46	33	-10.04	0.05	0.00	0.00	0.11	0.01
58	45	47	29.74	0.79	0.00	0.00	0.34	0.10
59	47	211	15.78	1.35	0.00	0.00	0.40	0.21
60	47	48	1.36	0.01	0.00	0.00	0.03	0.00
61	4	49	23.94	0.13	0.00	0.00	0.27	0.06
62	9	50	-26.48	0.51	0.00	0.00	0.30	0.08
63	22	102	17.64	1.60	0.00	0.00	0.80	1.07
64	102	75	17.64	0.95	0.00	0.00	0.45	0.26
65	75	73	14.28	0.32	0.00	0.00	0.36	0.18
66	73	70	10.92	0.11	0.00	0.00	0.28	0.11
67-RV	70	100	3.36	0.00	0.00	0.00	0.09	0.01
68-XX	70	100						
69	100	72	3.36	0.04	0.00	0.00	0.09	0.01
70	8	80	-65.90	3.67	0.00	0.00	0.75	0.42
71	80	81	-79.76	0.82	0.00	0.00	0.91	0.60
72	81	83	-104.46	1.53	0.00	0.00	1.19	0.99
73	82	83	168.54	0.24	0.00	0.00	1.91	2.39
74-FG	CC	98	168.54	0.00	0.00	0.00	0.48	0.08
75	98	82	168.54	0.32	0.00	0.00	1.91	2.39
76	83	84	64.08	16.01	0.00	0.00	1.64	2.87
77	84	85	5.46	0.11	0.00	0.00	0.14	0.03
78	85	86	2.10	0.01	0.00	0.00	0.05	0.01
79	80	87	1.26	0.00	0.00	0.00	0.01	0.00
80	81	88	19.66	0.08	0.00	0.00	0.22	0.04
81	88	101	1.26	0.00	0.00	0.00	0.03	0.00
82-RV	101	103	1.26	0.00	0.00	0.00	0.03	0.00
83-XX	101	103						
84	103	89	1.26	0.01	0.00	0.00	0.03	0.00
85	88	90	15.46	0.34	0.00	0.00	0.39	0.21
86	90	91	0.84	0.00	0.00	0.00	0.02	0.00
87-PU	110	12	212.42	0.18	127.61 P2	0.00	2.41	3.67
88-XXCV	110	12						
89	200	2	256.15	2.59	0.00	0.00	2.91	5.19
90	84	201	56.94	3.35	0.00	0.00	1.45	2.03
91	201	202	56.16	8.02	0.00	0.00	1.43	1.98
92	202	203	55.38	3.86	0.00	0.00	1.41	1.93
93	203	204	8.58	0.66	0.00	0.00	0.22	0.06
94	204	205	2.34	0.02	0.00	0.00	0.06	0.01

95	204	206	2.52	0.01	0.00	0.00	0.06	0.01
96	203	208	41.16	1.00	0.00	0.00	1.05	1.11
97	204	207	0.57	0.00	0.00	0.00	0.01	0.00
98	208	209	2.73	0.01	0.00	0.00	0.07	0.01
99	208	210	30.81	2.34	0.00	0.00	0.79	0.65
100	211	38	14.98	0.42	0.00	0.00	0.38	0.17
101	15	212	5.46	0.01	0.00	0.00	0.06	0.00
102	213	48	4.94	0.09	0.00	0.00	0.13	0.02
103	214	18	39.10	3.09	0.00	0.00	1.00	1.01
104	214	215	0.46	0.00	0.00	0.00	0.01	0.00
105	19	218	0.46	0.00	0.00	0.00	0.01	0.00
106	46	216	0.92	0.00	0.00	0.00	0.02	0.00
107	216	217	0.46	0.00	0.00	0.00	0.01	0.00
108	212	213	5.33	0.01	0.00	0.00	0.06	0.00
109-CV	15	50	62.18	0.93	0.00	0.00	0.71	0.33
110	210	225	28.08	2.52	0.00	0.00	0.72	0.55
111	225	224	27.30	4.94	0.00	0.00	0.70	0.52
112	224	219	25.74	1.35	0.00	0.00	0.66	0.47
113	219	220	3.90	0.11	0.00	0.00	0.10	0.01
114	219	223	7.41	0.32	0.00	0.00	0.19	0.05
115	223	221	0.78	0.00	0.00	0.00	0.02	0.00
116	223	222	3.12	0.05	0.00	0.00	0.08	0.01

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
2		0.00	1075.62	980.00	95.62	41.44
3		3.36	1148.88	985.00	163.88	71.02
4		15.54	1128.78	970.00	158.78	68.80
5		7.98	1129.16	979.00	150.16	65.07
6		2.94	1129.12	810.00	319.12	138.28
7		13.86	1130.40	962.00	168.40	72.97
8		5.04	1131.41	963.00	168.41	72.98
9		41.61	1109.87	960.00	149.87	64.94
10		19.74	1085.68	924.00	161.68	70.06
11		2.10	1064.77	710.00	354.77	153.74
12		5.04	1152.14	948.00	204.14	88.46
13		3.36	1151.45	880.00	271.45	117.63
14		0.84	1151.44	905.00	246.44	106.79
15		2.10	1111.31	795.00	316.31	137.07
16		19.74	1140.81	980.00	160.81	69.69
17		11.34	1119.28	974.00	145.28	62.96

18	4.20	1110.85	960.00	150.85	65.37
19	4.20	1099.39	962.00	137.39	59.53
20	4.20	1096.74	943.00	153.74	66.62
21	4.20	1092.03	966.00	126.03	54.61
22	4.20	1091.64	960.00	131.64	57.04
23	1.26	1119.27	954.00	165.27	71.62
24	2.52	1140.73	964.00	176.73	76.58
25	7.98	1139.94	973.00	166.94	72.34
26	5.46	1139.90	970.00	169.90	73.62
27	13.86	1114.30	990.00	124.30	53.86
28	2.10	1114.14	780.00	334.14	144.80
29	3.78	1113.64	960.00	153.64	66.58
30	1.68	1113.56	960.00	153.56	66.54
31	3.36	1112.67	941.00	171.67	74.39
32	5.04	1112.20	984.00	128.20	55.56
33	2.94	1112.06	805.00	307.06	133.06
34	1.26	1111.41	900.00	211.41	91.61
35	4.62	1110.49	960.00	150.49	65.21
36	5.04	1109.69	880.00	229.69	99.53
37	4.62	1109.44	845.00	264.44	114.59
38	7.56	1109.44	950.00	159.44	69.09
39	2.52	1108.85	927.00	181.85	78.80
40	2.10	1108.80	965.00	143.80	62.31
41	2.10	1108.75	905.00	203.75	88.29
42	14.28	1139.73	995.00	144.73	62.72
43	0.00	1139.95	1007.00	132.95	57.61
44	5.04	1113.07	788.00	325.07	140.86
45	10.08	1112.00	984.00	128.00	55.47
46	5.04	1112.01	967.00	145.01	62.84
47	12.60	1111.21	992.00	119.21	51.66
48	6.30	1111.20	990.00	121.20	52.52
49	23.94	1128.65	900.00	228.65	99.08
50	35.70	1110.38	960.00	150.38	65.16
51	0.00	1073.34	978.00	95.34	41.31
52	0.00	1185.49	978.00	207.49	89.91
70	7.56	1088.65	720.00	368.65	159.75
72	3.36	835.34	567.00	268.34	116.28
73	3.36	1088.76	795.00	293.76	127.30
75	3.36	1089.08	795.00	294.08	127.44
80	12.60	1135.09	972.00	163.09	70.67
81	5.04	1135.91	966.00	169.91	73.63
82	0.00	1137.68	978.57	159.11	68.95
83	0.00	1137.44	975.57	161.87	70.14
84	1.68	1121.43	956.00	165.43	71.69
85	3.36	1121.31	942.00	179.31	77.70
86	2.10	1121.30	930.00	191.30	82.90
87	1.26	1135.09	970.00	165.09	71.54

88		2.94	1135.83	961.00	174.83	75.76
89		1.26	915.99	717.00	198.99	86.23
90		14.62	1135.49	963.00	172.49	74.75
91		0.84	1135.48	938.00	197.48	85.58
94		0.00	1072.64	800.00	272.64	118.14
95		0.00	1072.60	800.00	272.60	118.13
96		0.00	1067.94	700.00	367.94	159.44
97		0.00	1067.93	700.00	367.93	159.44
98		0.00	1138.00	1114.50	23.50	10.18
99		0.00	1140.00	1118.70	21.30	9.23
100		0.00	835.38	720.00	115.38	50.00
101		0.00	1135.83	846.00	289.83	125.59
102		0.00	1090.03	880.00	210.03	91.01
103		0.00	916.00	846.00	70.00	30.33
110		0.00	1024.71	948.00	76.71	33.24
200		0.00	1078.22	980.00	98.22	42.56
201		0.78	1118.08	755.00	363.08	157.33
202		0.78	1110.06	980.00	130.06	56.36
203		5.64	1106.20	960.00	146.20	63.35
204		3.15	1105.54	965.00	140.54	60.90
205		2.34	1105.52	720.00	385.52	167.06
206		2.52	1105.53	920.00	185.53	80.40
207		0.57	1105.54	920.00	185.54	80.40
208		7.62	1105.20	850.00	255.20	110.59
209		2.73	1105.19	945.00	160.19	69.42
210		2.73	1102.86	956.00	146.86	63.64
211		0.80	1109.86	1010.00	99.86	43.27
212		0.13	1111.30	1000.00	111.30	48.23
213		0.39	1111.29	920.00	191.29	82.89
214	TURNER RIDGE	0.46	1113.94	968.00	145.94	63.24
215	" "	0.46	1113.94	970.00	143.94	62.37
216	PEYTONTOWN	0.46	1112.00	850.00	262.00	113.54
217	MORGAN SUMMI	0.46	1112.00	850.00	262.00	113.53
218	BURTON LANE	0.46	1099.39	950.00	149.39	64.73
219	CUZICK	14.43	1094.04	913.00	181.04	78.45
220	CUZICK	3.90	1093.93	720.00	373.93	162.04
221	CUZICK	0.78	1093.72	820.00	273.72	118.61
222	CUZICK	3.12	1093.67	780.00	313.67	135.92
223	CUZICK	3.51	1093.72	880.00	213.72	92.61
224	CUZICK	1.56	1095.39	961.00	134.39	58.24
225	CUZICK	0.78	1100.33	760.00	340.33	147.48

R E G U L A T I N G V A L V E R E P O R T

RV	VALVE POSITION	CONTROLLED VALVE	VALVE	UPSTREAM	DOWNSTREAM	THROUGH

LABEL	TYPE	NODE	PIPE	SETTING (ft or gpm)	STATUS	GRADE (ft)	GRADE (ft)	FLOW (gpm)
R1	PRV-1	70	67	835.38	THROTTLED	1088.65	835.38	3.36
R2	PRV-1	101	82	916.00	THROTTLED	1135.83	916.00	1.26

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM FIXED GRADE NODES
(-) OUTFLOWS FROM THE SYSTEM INTO FIXED GRADE NODES

NODE LABEL	PIPE NUMBER	FLOWRATE (gpm)	NODE TITLE
AA	1	256.15	
BB	53	67.58	
CC	74	168.54	

NET SYSTEM INFLOW = 492.27
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 492.27

C H A N G E S F O R N E X T S I M U L A T I O N

P I P E P A R A M E T E R C H A N G E S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE NOS. #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	FGN-HGL (ft)
4-XXPU	51	52	5.0	6.0	140.00	0.00	0.00

THE PUMP IDENTIFYING NUMBER (ID) = 1

****
S I M U L A T I O N R E S U L T S
****

THE RESULTS ARE OBTAINED AFTER 8 TRIALS WITH AN ACCURACY = 0.00000
THE REGULATING VALVES REQUIRED 1 ADJUSTMENTS

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

KIRKSVILLE WATER ASSOCIATION-DEMANDS SHOWN = NORMAL X 3
PEAK DEMANDS PUMP #1 OFF-PUMP #2 ON
EXISTING SYSTEM -HAGANS MILL LINE ADDED

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS. #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	PUMP LABEL	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)

1-FG	AA	200	58.88	0.51	0.00	0.00	0.67	0.34
2	2	51	58.88	0.15	0.00	0.00	0.67	0.34
3-CV	51	52	58.88	0.00	0.00	0.00	0.67	0.34
4-XXPU	51	52						
5	52	3	58.88	2.40	0.00	0.00	0.67	0.34
6	3	4	55.52	1.21	0.00	0.00	0.63	0.31
7	4	5	-144.42	5.03	0.00	0.00	1.64	1.80
8	5	6	2.94	0.05	0.00	0.00	0.08	0.01
9	5	7	-155.34	11.30	0.00	0.00	1.76	2.05
10	7	8	-169.20	6.74	0.00	0.00	1.92	2.41
11	4	9	160.46	8.36	0.00	0.00	1.82	2.18
12	9	10	199.02	17.88	0.00	0.00	2.26	3.25
13	10	94	179.28	9.35	0.00	0.00	2.03	2.68
14	94	95	179.28	0.03	0.00	0.00	2.03	2.68
15-XX	94	95						
16	95	96	179.28	3.35	0.00	0.00	2.03	2.68
17	96	97	89.64	0.00	0.00	0.00	1.02	0.74
18-CV	96	97	89.64	0.00	0.00	0.00	1.02	0.74
19	97	11	179.28	2.26	0.00	0.00	2.03	2.68
20	11	110	177.18	28.63	0.00	0.00	2.01	2.62
21	12	13	92.32	1.04	0.00	0.00	1.05	0.78
22	13	14	0.84	0.01	0.00	0.00	0.04	0.00
23	13	15	88.12	61.91	0.00	0.00	2.25	5.18
24	12	16	79.82	4.37	0.00	0.00	0.91	0.60
25	16	17	52.62	21.53	0.00	0.00	1.34	1.99
26	17	214	40.02	5.34	0.00	0.00	1.02	1.20
27	18	19	34.90	11.46	0.00	0.00	0.89	0.93
28	19	20	30.24	2.64	0.00	0.00	0.77	0.71
29	20	21	26.04	4.71	0.00	0.00	0.66	0.54
30	21	22	21.84	0.39	0.00	0.00	0.56	0.39
31	17	23	1.26	0.01	0.00	0.00	0.03	0.00
32	16	24	2.52	0.09	0.00	0.00	0.11	0.03
33	16	25	4.94	0.01	0.00	0.00	0.06	0.00
34	25	26	5.46	0.04	0.00	0.00	0.14	0.03
35	25	42	-8.50	0.01	0.00	0.00	0.10	0.01
36	27	28	2.10	0.15	0.00	0.00	0.10	0.02
37	27	29	57.60	1.20	0.00	0.00	0.65	0.33
38	29	30	1.68	0.08	0.00	0.00	0.08	0.01
39	29	31	52.14	1.90	0.00	0.00	0.59	0.27
40	31	32	48.78	0.96	0.00	0.00	0.55	0.24
41	32	33	25.37	0.51	0.00	0.00	0.29	0.07
42	32	34	18.37	1.18	0.00	0.00	0.47	0.28
43	34	35	17.11	1.42	0.00	0.00	0.44	0.25
44	35	36	12.49	1.47	0.00	0.00	0.32	0.14
45	36	37	7.45	0.84	0.00	0.00	0.19	0.05
46	37	38	2.83	0.07	0.00	0.00	0.07	0.01
47	38	39	6.72	0.59	0.00	0.00	0.30	0.18

48	39	40	2.10	0.05	0.00	0.00	0.10	0.02
49	39	41	2.10	0.10	0.00	0.00	0.10	0.02
50	27	42	-133.73	44.87	0.00	0.00	3.41	11.22
51	42	43	-156.51	1.05	0.00	0.00	4.00	15.01
52	43	99	-156.51	0.23	0.00	0.00	1.78	2.08
53-FG	99	BB	-156.51	0.00	0.00	0.00	0.44	0.07
54	27	44	60.17	2.52	0.00	0.00	0.68	0.35
55	44	45	55.13	2.39	0.00	0.00	0.63	0.30
56	45	46	-16.47	0.12	0.00	0.00	0.19	0.03
57	46	33	-22.43	0.21	0.00	0.00	0.25	0.06
58	45	47	61.52	3.04	0.00	0.00	0.70	0.37
59	47	211	12.25	0.84	0.00	0.00	0.31	0.13
60	47	48	36.67	2.76	0.00	0.00	0.94	1.02
61	4	49	23.94	0.13	0.00	0.00	0.27	0.06
62	9	50	-80.17	4.00	0.00	0.00	0.91	0.60
63	22	102	17.64	1.60	0.00	0.00	0.80	1.07
64	102	75	17.64	0.95	0.00	0.00	0.45	0.26
65	75	73	14.28	0.32	0.00	0.00	0.36	0.18
66	73	70	10.92	0.11	0.00	0.00	0.28	0.11
67-RV	70	100	3.36	0.00	0.00	0.00	0.09	0.01
68-XX	70	100						
69	100	72	3.36	0.04	0.00	0.00	0.09	0.01
70	8	80	-174.24	22.24	0.00	0.00	1.98	2.54
71	80	81	-188.10	4.03	0.00	0.00	2.13	2.93
72	81	83	-212.80	5.71	0.00	0.00	2.41	3.68
73	82	83	276.88	0.60	0.00	0.00	3.14	5.99
74-FG	CC	98	276.88	0.00	0.00	0.00	0.79	0.20
75	98	82	276.88	0.81	0.00	0.00	3.14	5.99
76	83	84	64.08	16.01	0.00	0.00	1.64	2.87
77	84	85	5.46	0.11	0.00	0.00	0.14	0.03
78	85	86	2.10	0.01	0.00	0.00	0.05	0.01
79	80	87	1.26	0.00	0.00	0.00	0.01	0.00
80	81	88	19.66	0.08	0.00	0.00	0.22	0.04
81	88	101	1.26	0.00	0.00	0.00	0.03	0.00
82-RV	101	103	1.26	0.00	0.00	0.00	0.03	0.00
83-XX	101	103						
84	103	89	1.26	0.01	0.00	0.00	0.03	0.00
85	88	90	15.46	0.34	0.00	0.00	0.39	0.21
86	90	91	0.84	0.00	0.00	0.00	0.02	0.00
87-PU	110	12	177.18	0.13	131.53	P2 0.00	2.01	2.62
88-XXCV	110	12						
89	200	2	58.88	0.17	0.00	0.00	0.67	0.34
90	84	201	56.94	3.35	0.00	0.00	1.45	2.03
91	201	202	56.16	8.02	0.00	0.00	1.43	1.98
92	202	203	55.38	3.86	0.00	0.00	1.41	1.93
93	203	204	8.58	0.66	0.00	0.00	0.22	0.06
94	204	205	2.34	0.02	0.00	0.00	0.06	0.01

95	204	206	2.52	0.01	0.00	0.00	0.06	0.01
96	203	208	41.16	1.00	0.00	0.00	1.05	1.11
97	204	207	0.57	0.00	0.00	0.00	0.01	0.00
98	208	209	2.73	0.01	0.00	0.00	0.07	0.01
99	208	210	30.81	2.34	0.00	0.00	0.79	0.65
100	211	38	11.45	0.25	0.00	0.00	0.29	0.10
101	15	212	-29.85	0.30	0.00	0.00	0.34	0.09
102	213	48	-30.37	2.51	0.00	0.00	0.78	0.63
103	214	18	39.10	3.09	0.00	0.00	1.00	1.01
104	214	215	0.46	0.00	0.00	0.00	0.01	0.00
105	19	218	0.46	0.00	0.00	0.00	0.01	0.00
106	46	216	0.92	0.00	0.00	0.00	0.02	0.00
107	216	217	0.46	0.00	0.00	0.00	0.01	0.00
108	212	213	-29.98	0.20	0.00	0.00	0.34	0.09
109-CV	15	50	115.87	2.94	0.00	0.00	1.31	1.05
110	210	225	28.08	2.52	0.00	0.00	0.72	0.55
111	225	224	27.30	4.94	0.00	0.00	0.70	0.52
112	224	219	25.74	1.35	0.00	0.00	0.66	0.47
113	219	220	3.90	0.11	0.00	0.00	0.10	0.01
114	219	223	7.41	0.32	0.00	0.00	0.19	0.05
115	223	221	0.78	0.00	0.00	0.00	0.02	0.00
116	223	222	3.12	0.05	0.00	0.00	0.08	0.01

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
2		0.00	1085.32	980.00	105.32	45.64
3		3.36	1082.76	985.00	97.76	42.36
4		15.54	1081.55	970.00	111.55	48.34
5		7.98	1086.58	979.00	107.58	46.62
6		2.94	1086.53	810.00	276.53	119.83
7		13.86	1097.88	962.00	135.88	58.88
8		5.04	1104.62	963.00	141.62	61.37
9		41.61	1073.19	960.00	113.19	49.05
10		19.74	1055.31	924.00	131.31	56.90
11		2.10	1040.31	710.00	330.31	143.14
12		5.04	1143.09	948.00	195.09	84.54
13		3.36	1142.05	880.00	262.05	113.55
14		0.84	1142.04	905.00	237.04	102.72
15		2.10	1080.13	795.00	285.13	123.56
16		19.74	1138.72	980.00	158.72	68.78
17		11.34	1117.18	974.00	143.18	62.05

18	4.20	1108.75	960.00	148.75	64.46
19	4.20	1097.29	962.00	135.29	58.62
20	4.20	1094.64	943.00	151.64	65.71
21	4.20	1089.93	966.00	123.93	53.70
22	4.20	1089.54	960.00	129.54	56.13
23	1.26	1117.17	954.00	163.17	70.71
24	2.52	1138.63	964.00	174.63	75.67
25	7.98	1138.71	973.00	165.71	71.81
26	5.46	1138.67	970.00	168.67	73.09
27	13.86	1093.85	990.00	103.85	45.00
28	2.10	1093.69	780.00	313.69	135.93
29	3.78	1092.65	960.00	132.65	57.48
30	1.68	1092.57	960.00	132.57	57.45
31	3.36	1090.74	941.00	149.74	64.89
32	5.04	1089.78	984.00	105.78	45.84
33	2.94	1089.27	805.00	284.27	123.18
34	1.26	1088.60	900.00	188.60	81.73
35	4.62	1087.18	960.00	127.18	55.11
36	5.04	1085.72	880.00	205.72	89.14
37	4.62	1084.87	845.00	239.87	103.95
38	7.56	1084.80	950.00	134.80	58.41
39	2.52	1084.21	927.00	157.21	68.12
40	2.10	1084.16	965.00	119.16	51.64
41	2.10	1084.11	905.00	179.11	77.61
42	14.28	1138.72	995.00	143.72	62.28
43	0.00	1139.77	1007.00	132.77	57.53
44	5.04	1091.32	788.00	303.32	131.44
45	10.08	1088.94	984.00	104.94	45.47
46	5.04	1089.05	967.00	122.05	52.89
47	12.60	1085.90	992.00	93.90	40.69
48	6.30	1083.14	990.00	93.14	40.36
49	23.94	1081.42	900.00	181.42	78.62
50	35.70	1077.19	960.00	117.19	50.78
51	0.00	1085.17	978.00	107.17	46.44
52	0.00	1085.17	978.00	107.17	46.44
70	7.56	1086.55	720.00	366.55	158.84
72	3.36	835.34	567.00	268.34	116.28
73	3.36	1086.67	795.00	291.67	126.39
75	3.36	1086.99	795.00	291.99	126.53
80	12.60	1126.86	972.00	154.86	67.11
81	5.04	1130.89	966.00	164.89	71.45
82	0.00	1137.19	978.57	158.62	68.74
83	0.00	1136.59	975.57	161.02	69.78
84	1.68	1120.58	956.00	164.58	71.32
85	3.36	1120.47	942.00	178.47	77.34
86	2.10	1120.46	930.00	190.46	82.53
87	1.26	1126.86	970.00	156.86	67.97

88		2.94	1130.81	961.00	169.81	73.58
89		1.26	915.99	717.00	198.99	86.23
90		14.62	1130.47	963.00	167.47	72.57
91		0.84	1130.46	938.00	192.46	83.40
94		0.00	1045.96	800.00	245.96	106.58
95		0.00	1045.93	800.00	245.93	106.57
96		0.00	1042.58	700.00	342.58	148.45
97		0.00	1042.58	700.00	342.58	148.45
98		0.00	1138.00	1114.50	23.50	10.18
99		0.00	1140.00	1118.70	21.30	9.23
100		0.00	835.38	720.00	115.38	50.00
101		0.00	1130.80	846.00	284.80	123.41
102		0.00	1087.93	880.00	207.93	90.10
103		0.00	916.00	846.00	70.00	30.33
110		0.00	1011.68	948.00	63.68	27.60
200		0.00	1085.49	980.00	105.49	45.71
201		0.78	1117.23	755.00	362.23	156.97
202		0.78	1109.21	980.00	129.21	55.99
203		5.64	1105.36	960.00	145.36	62.99
204		3.15	1104.70	965.00	139.70	60.54
205		2.34	1104.67	720.00	384.67	166.69
206		2.52	1104.68	920.00	184.68	80.03
207		0.57	1104.70	920.00	184.70	80.03
208		7.62	1104.35	850.00	254.35	110.22
209		2.73	1104.34	945.00	159.34	69.05
210		2.73	1102.01	956.00	146.01	63.27
211		0.80	1085.05	1010.00	75.05	32.52
212		0.13	1080.43	1000.00	80.43	34.85
213		0.39	1080.63	920.00	160.63	69.61
214	TURNER RIDGE	0.46	1111.84	968.00	143.84	62.33
215	" "	0.46	1111.84	970.00	141.84	61.46
216	PEYTONTOWN	0.46	1089.05	850.00	239.05	103.59
217	MORGAN SUMMI	0.46	1089.05	850.00	239.05	103.59
218	BURTON LANE	0.46	1097.29	950.00	147.29	63.82
219	CUZICK	14.43	1093.19	913.00	180.19	78.08
220	CUZICK	3.90	1093.08	720.00	373.08	161.67
221	CUZICK	0.78	1092.87	820.00	272.87	118.24
222	CUZICK	3.12	1092.82	780.00	312.82	135.56
223	CUZICK	3.51	1092.87	880.00	212.87	92.24
224	CUZICK	1.56	1094.54	961.00	133.54	57.87
225	CUZICK	0.78	1099.49	760.00	339.49	147.11

REGULATING VALVE REPORT

RV	VALVE POSITION	CONTROLLED VALVE	VALVE	UPSTREAM	DOWNSTREAM	THROUGH

LABEL	TYPE	NODE	PIPE	SETTING (ft or gpm)	STATUS	GRADE (ft)	GRADE (ft)	FLOW (gpm)
R1	PRV-1	70	67	835.38	THROTTLED	1086.55	835.38	3.36
R2	PRV-1	101	82	916.00	THROTTLED	1130.80	916.00	1.26

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM FIXED GRADE NODES
(-) OUTFLOWS FROM THE SYSTEM INTO FIXED GRADE NODES

NODE LABEL	PIPE NUMBER	FLOWRATE (gpm)	NODE TITLE
AA	1	58.88	
BB	53	156.51	
CC	74	276.88	

NET SYSTEM INFLOW = 492.27
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 492.27

C H A N G E S F O R N E X T S I M U L A T I O N

D E M A N D C H A N G E S

DEMAND TYPE = 1 - GDF = 0.330

P I P E P A R A M E T E R C H A N G E S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE NOS. #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	FGN-HGL (ft)
87-XXPU	110	12	50.0	6.0	140.00	0.00	0.00

THE PUMP IDENTIFYING NUMBER (ID) = 2

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S I M U L A T I O N R E S U L T S
****

THE RESULTS ARE OBTAINED AFTER 10 TRIALS WITH AN ACCURACY = 0.00074
THE REGULATING VALVES REQUIRED 1 ADJUSTMENTS

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

KIRKSVILLE WATER ASSOCIATION-DEMANDS SHOWN = NORMAL X 3
NORMAL DEMANDS PUMPS #1 AND #2 OFF
PROPOSED SYSTEM

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE FG -FIXED GRADE NODE PU -PUMP LINE
CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS. #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	PUMP LABEL	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
1-FG	AA	200	0.00	0.00	0.00		0.00	0.00	0.00
2	2	51	0.00	0.00	0.00		0.00	0.00	0.00
3-XXCV	51	52							
4-XXPU	51	52							
5	52	3	0.00	0.00	0.00		0.00	0.00	0.00
6	3	4	-1.11	0.00	0.00		0.00	0.01	0.00
7	4	5	-27.29	0.23	0.00		0.00	0.31	0.08
8	5	6	0.97	0.01	0.00		0.00	0.02	0.00
9	5	7	-30.89	0.57	0.00		0.00	0.35	0.10
10	7	8	-35.46	0.37	0.00		0.00	0.40	0.13
11	4	9	13.15	0.08	0.00		0.00	0.15	0.02
12	9	10	7.21	0.04	0.00		0.00	0.08	0.01
13	10	94	0.69	0.00	0.00		0.00	0.01	0.00
14	94	95	0.69	0.00	0.00		0.00	0.01	0.00
15-XX	94	95							
16	95	96	0.69	0.00	0.00		0.00	0.01	0.00
17	96	97	0.05	0.00	0.00		0.00	0.00	0.00
18-CV	96	97	0.65	0.00	0.00		0.00	0.01	0.00
19	97	11	0.69	0.00	0.00		0.00	0.01	0.00
20	11	110	0.00	0.00	0.00		0.00	0.00	0.00
21	12	13	19.70	0.06	0.00		0.00	0.22	0.04
22	13	14	0.28	0.00	0.00		0.00	0.01	0.00
23	13	15	18.31	3.37	0.00		0.00	0.47	0.28
24	12	16	-21.36	0.38	0.00		0.00	0.24	0.05
25	16	17	17.36	2.76	0.00		0.00	0.44	0.26
26	17	214	13.21	0.69	0.00		0.00	0.34	0.15
27	18	19	11.52	1.47	0.00		0.00	0.29	0.12
28	19	20	9.98	0.34	0.00		0.00	0.25	0.09
29	20	21	8.59	0.60	0.00		0.00	0.22	0.07
30	21	22	7.21	0.05	0.00		0.00	0.18	0.05
31	17	23	0.42	0.00	0.00		0.00	0.01	0.00
32	16	24	0.83	0.01	0.00		0.00	0.04	0.00
33	16	25	-46.07	0.56	0.00		0.00	0.52	0.22
34	25	26	1.80	0.01	0.00		0.00	0.05	0.00
35	25	42	-50.51	0.26	0.00		0.00	0.57	0.26
36	27	28	0.69	0.02	0.00		0.00	0.03	0.00
37	27	29	15.45	0.11	0.00		0.00	0.18	0.03
38	29	30	0.55	0.01	0.00		0.00	0.03	0.00
39	29	31	13.65	0.16	0.00		0.00	0.15	0.02
40	31	32	12.54	0.08	0.00		0.00	0.14	0.02
41	32	33	5.65	0.03	0.00		0.00	0.06	0.00
42	32	34	5.23	0.11	0.00		0.00	0.13	0.03

43	34	35	4.81	0.14	0.00	0.00	0.12	0.02
44	35	36	3.29	0.12	0.00	0.00	0.08	0.01
45	36	37	1.62	0.05	0.00	0.00	0.04	0.00
46	37	38	0.10	0.00	0.00	0.00	0.00	0.00
47	38	39	2.22	0.08	0.00	0.00	0.10	0.02
48	39	40	0.69	0.01	0.00	0.00	0.03	0.00
49	39	41	0.69	0.01	0.00	0.00	0.03	0.00
50	27	42	-36.23	4.00	0.00	0.00	0.92	1.00
51	42	43	-91.45	0.39	0.00	0.00	2.33	5.55
52	43	99	-91.45	0.09	0.00	0.00	1.04	0.77
53-FG	99	BB	-91.45	0.00	0.00	0.00	0.26	0.03
54	27	44	15.51	0.20	0.00	0.00	0.18	0.03
55	44	45	13.85	0.18	0.00	0.00	0.16	0.02
56	45	46	-2.71	0.00	0.00	0.00	0.03	0.00
57	46	33	-4.68	0.01	0.00	0.00	0.05	0.00
58	45	47	13.23	0.18	0.00	0.00	0.15	0.02
59	47	211	4.88	0.15	0.00	0.00	0.12	0.02
60	47	48	4.20	0.05	0.00	0.00	0.11	0.02
61	4	49	7.90	0.02	0.00	0.00	0.09	0.01
62	9	50	-7.79	0.05	0.00	0.00	0.09	0.01
63	22	102	5.82	0.21	0.00	0.00	0.26	0.14
64	102	75	5.82	0.12	0.00	0.00	0.15	0.03
65	75	73	4.71	0.04	0.00	0.00	0.12	0.02
66	73	70	3.60	0.01	0.00	0.00	0.09	0.01
67-RV	70	100	1.11	0.00	0.00	0.00	0.03	0.00
68-XX	70	100						
69	100	72	1.11	0.01	0.00	0.00	0.03	0.00
70	8	80	-37.13	1.27	0.00	0.00	0.42	0.15
71	80	81	-41.70	0.25	0.00	0.00	0.47	0.18
72	81	83	-49.85	0.39	0.00	0.00	0.57	0.25
73	82	83	71.00	0.05	0.00	0.00	0.81	0.48
74-FG	CC	98	71.00	0.00	0.00	0.00	0.20	0.02
75	98	82	71.00	0.07	0.00	0.00	0.81	0.48
76	83	84	21.15	2.05	0.00	0.00	0.54	0.37
77	84	85	1.80	0.01	0.00	0.00	0.05	0.00
78	85	86	0.69	0.00	0.00	0.00	0.02	0.00
79	80	87	0.42	0.00	0.00	0.00	0.00	0.00
80	81	88	6.49	0.01	0.00	0.00	0.07	0.01
81	88	101	0.42	0.00	0.00	0.00	0.01	0.00
82-RV	101	103	0.42	0.00	0.00	0.00	0.01	0.00
83-XX	101	103						
84	103	89	0.42	0.00	0.00	0.00	0.01	0.00
85	88	90	5.10	0.04	0.00	0.00	0.13	0.03
86	90	91	0.28	0.00	0.00	0.00	0.01	0.00
87-XXPU	110	12						
88-XXCV	110	12						
89	200	2	0.00	0.00	0.00	0.00	0.00	0.00

90	84	201	18.79	0.43	0.00	0.00	0.48	0.26
91	201	202	18.53	1.03	0.00	0.00	0.47	0.25
92	202	203	18.28	0.50	0.00	0.00	0.47	0.25
93	203	204	2.83	0.08	0.00	0.00	0.07	0.01
94	204	205	0.77	0.00	0.00	0.00	0.02	0.00
95	204	206	0.83	0.00	0.00	0.00	0.02	0.00
96	203	208	13.58	0.13	0.00	0.00	0.35	0.14
97	204	207	0.19	0.00	0.00	0.00	0.00	0.00
98	208	209	0.90	0.00	0.00	0.00	0.02	0.00
99	208	210	10.17	0.30	0.00	0.00	0.26	0.08
100	211	38	4.61	0.05	0.00	0.00	0.12	0.02
101	15	212	-1.95	0.00	0.00	0.00	0.02	0.00
102	213	48	-2.12	0.02	0.00	0.00	0.05	0.00
103	214	18	12.90	0.40	0.00	0.00	0.33	0.13
104	214	215	0.15	0.00	0.00	0.00	0.00	0.00
105	19	218	0.15	0.00	0.00	0.00	0.00	0.00
106	46	216	0.30	0.00	0.00	0.00	0.01	0.00
107	216	217	0.15	0.00	0.00	0.00	0.00	0.00
108	212	213	-1.99	0.00	0.00	0.00	0.02	0.00
109-CV	15	50	19.57	0.11	0.00	0.00	0.22	0.04
110	210	225	9.27	0.32	0.00	0.00	0.24	0.07
111	225	224	9.01	0.63	0.00	0.00	0.23	0.07
112	224	219	8.49	0.17	0.00	0.00	0.22	0.06
113	219	220	1.29	0.01	0.00	0.00	0.03	0.00
114	219	223	2.45	0.04	0.00	0.00	0.06	0.01
115	223	221	0.26	0.00	0.00	0.00	0.01	0.00
116	223	222	1.03	0.01	0.00	0.00	0.03	0.00

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
2		0.00	1086.00	980.00	106.00	45.93
3		1.11	1134.81	985.00	149.81	64.92
4		5.13	1134.81	970.00	164.81	71.42
5		2.63	1135.04	979.00	156.04	67.62
6		0.97	1135.03	810.00	325.03	140.85
7		4.57	1135.61	962.00	173.61	75.23
8		1.66	1135.98	963.00	172.98	74.96
9		13.73	1134.73	960.00	174.73	75.72
10		6.51	1134.69	924.00	210.69	91.30
11		0.69	1134.69	710.00	424.69	184.03
12		1.66	1138.33	948.00	190.33	82.47

13	1.11	1138.27	880.00	258.27	111.92
14	0.28	1138.27	905.00	233.27	101.08
15	0.69	1134.89	795.00	339.89	147.29
16	6.51	1138.71	980.00	158.71	68.77
17	3.74	1135.94	974.00	161.94	70.18
18	1.39	1134.86	960.00	174.86	75.77
19	1.39	1133.39	962.00	171.39	74.27
20	1.39	1133.05	943.00	190.05	82.36
21	1.39	1132.45	966.00	166.45	72.13
22	1.39	1132.40	960.00	172.40	74.70
23	0.42	1135.94	954.00	181.94	78.84
24	0.83	1138.70	964.00	174.70	75.70
25	2.63	1139.27	973.00	166.27	72.05
26	1.80	1139.26	970.00	169.26	73.35
27	4.57	1135.53	990.00	145.53	63.06
28	0.69	1135.51	780.00	355.51	154.05
29	1.25	1135.43	960.00	175.43	76.02
30	0.55	1135.42	960.00	175.42	76.01
31	1.11	1135.27	941.00	194.27	84.18
32	1.66	1135.19	984.00	151.19	65.51
33	0.97	1135.16	805.00	330.16	143.07
34	0.42	1135.07	900.00	235.07	101.87
35	1.52	1134.94	960.00	174.94	75.81
36	1.66	1134.81	880.00	254.81	110.42
37	1.52	1134.76	845.00	289.76	125.56
38	2.49	1134.76	950.00	184.76	80.06
39	0.83	1134.69	927.00	207.69	90.00
40	0.69	1134.68	965.00	169.68	73.53
41	0.69	1134.67	905.00	229.67	99.53
42	4.71	1139.53	995.00	144.53	62.63
43	0.00	1139.91	1007.00	132.91	57.60
44	1.66	1135.33	788.00	347.33	150.51
45	3.33	1135.14	984.00	151.14	65.49
46	1.66	1135.14	967.00	168.14	72.86
47	4.16	1134.96	992.00	142.96	61.95
48	2.08	1134.91	990.00	144.91	62.80
49	7.90	1134.79	900.00	234.79	101.74
50	11.78	1134.78	960.00	174.78	75.74
51	0.00	1086.00	978.00	108.00	46.80
52	0.00	1134.81	978.00	156.81	67.95
70	2.49	1132.01	720.00	412.01	178.54
72	1.11	835.37	567.00	268.37	116.30
73	1.11	1132.03	795.00	337.03	146.05
75	1.11	1132.07	795.00	337.07	146.06
80	4.16	1137.25	972.00	165.25	71.61
81	1.66	1137.50	966.00	171.50	74.32
82	0.00	1137.93	978.57	159.36	69.06

83		0.00	1137.89	975.57	162.32	70.34
84		0.55	1135.83	956.00	179.83	77.93
85		1.11	1135.82	942.00	193.82	83.99
86		0.69	1135.82	930.00	205.82	89.19
87		0.42	1137.25	970.00	167.25	72.48
88		0.97	1137.49	961.00	176.49	76.48
89		0.42	916.00	717.00	199.00	86.23
90		4.82	1137.44	963.00	174.44	75.59
91		0.28	1137.44	938.00	199.44	86.43
94		0.00	1134.69	800.00	334.69	145.03
95		0.00	1134.69	800.00	334.69	145.03
96		0.00	1134.69	700.00	434.69	188.37
97		0.00	1134.69	700.00	434.69	188.37
98		0.00	1138.00	1114.50	23.50	10.18
99		0.00	1140.00	1118.70	21.30	9.23
100		0.00	835.38	720.00	115.38	50.00
101		0.00	1137.49	846.00	291.49	126.31
102		0.00	1132.19	880.00	252.19	109.28
103		0.00	916.00	846.00	70.00	30.33
110		0.00	1134.69	948.00	186.69	80.90
200		0.00	1086.00	980.00	106.00	45.93
201		0.26	1135.40	755.00	380.40	164.84
202		0.26	1134.37	980.00	154.37	66.90
203		1.86	1133.88	960.00	173.88	75.35
204		1.04	1133.79	965.00	168.79	73.14
205		0.77	1133.79	720.00	413.79	179.31
206		0.83	1133.79	920.00	213.79	92.64
207		0.19	1133.79	920.00	213.79	92.64
208		2.51	1133.75	850.00	283.75	122.96
209		0.90	1133.75	945.00	188.75	81.79
210		0.90	1133.45	956.00	177.45	76.89
211		0.26	1134.81	1010.00	124.81	54.08
212		0.04	1134.89	1000.00	134.89	58.45
213		0.13	1134.90	920.00	214.90	93.12
214	TURNER RIDGE	0.15	1135.26	968.00	167.26	72.48
215	" "	0.15	1135.26	970.00	165.26	71.61
216	PEYTONTOWN	0.15	1135.14	850.00	285.14	123.56
217	MORGAN SUMMI	0.15	1135.14	850.00	285.14	123.56
218	BURTON LANE	0.15	1133.39	950.00	183.39	79.47
219	CUZICK	4.76	1132.32	913.00	219.32	95.04
220	CUZICK	1.29	1132.30	720.00	412.30	178.66
221	CUZICK	0.26	1132.28	820.00	312.28	135.32
222	CUZICK	1.03	1132.27	780.00	352.27	152.65
223	CUZICK	1.16	1132.28	880.00	252.28	109.32
224	CUZICK	0.51	1132.49	961.00	171.49	74.31
225	CUZICK	0.26	1133.13	760.00	373.13	161.69

REGULATING VALVE REPORT

RV LABEL	VALVE TYPE	POSITION NODE	CONTROLLED PIPE	VALVE SETTING (ft or gpm)	VALVE STATUS	UPSTREAM GRADE (ft)	DOWNSTREAM GRADE (ft)	THROUGH FLOW (gpm)
R1	PRV-1	70	67	835.38	THROTTLED	1132.01	835.38	1.11
R2	PRV-1	101	82	916.00	THROTTLED	1137.49	916.00	0.42

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM FIXED GRADE NODES
(-) OUTFLOWS FROM THE SYSTEM INTO FIXED GRADE NODES

NODE LABEL	PIPE NUMBER	FLOWRATE (gpm)	NODE TITLE
AA	1	0.00	
BB	53	91.45	
CC	74	71.00	

NET SYSTEM INFLOW = 162.45
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 162.45

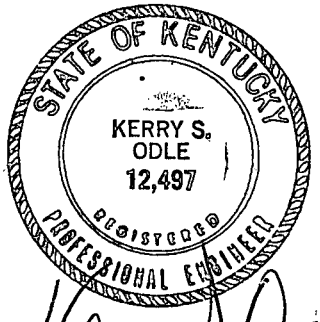
Final Engineering Report

Cuzick Water Line Extension

Kirksville Water Association

By
CMW, Inc.
Richmond, KY

December, 1998



12/15/98

EXHIBIT D

Table of Contents

CMW

December 14, 1998

To: Otis Bundy, President
Kirksville Water Association

From: Kerry Odle
CMW, Inc.

Re: Cuzick Water Line Extension
Kirksville Water Association

Subj.: Minutes Bid Opening
December 8, 1998

Bids were received by Kirksville Water Association until 2:00 p.m. EST on Tuesday, December 8, 1998. At 2:00 p.m. no additional bids were accepted and Kerry Odle, Project Engineer, thanked all bidders for their time in preparation of bids. Mr. Odle introduced Carl Turner, Commissioner, Paul Million, Commissioner, Billy May, Commissioner and Earl Jackson, Manager of Kirksville Water Association. Mr. Odle opened and read aloud all bids as shown on the attached "Tabulation of Bids". The apparent low bidder was announced as D & H Contracting Co., Inc. with a bid of $218,019.30. The engineer's estimate was announced as $290,852.75.

All bidders were thanked for their bids. A list of attendees is attached.

c: Tom Coffey W/A
File W/A

Cuzick Bid Opening =
December 8, 1998
Kirksville Water Association

	Name	Company
1.	Earl Jackson	Kirksville Water Assoc.
2.	K. Carrender	K. Carrender, Inc.
3.	Donnie Hudson	M & D Con.
4	Carl Turner	Kirksville Water Assoc
5	Edward Hall	Edward Hall Trucking & Exc
6	Ray Wagner	Anderson Cont.
7	Mike Mitchell	Anderson Cont.
8.	Doug Woods	Double D Const.
9	[illegible]	Kirksville Water Assoc.
10	Curtis Wellmott	Wellmott Const
11	Douglas Woods	Double D
12	Billy C. May	Kirksville Water Assoc
13	Kerry Odle	CMW, Inc

TABULATION OF BIDS

CMW, INC.
136 BIG HILL AVENUE
RICHMOND, KENTUCKY 40475

PROJECT Kirksville Water Association
Cuzick Water Line Extension

DATE December 8, 1998

CONTRACTORS	ADDENDA	BID BOND	TOTAL BID			
	___ ___ ___ ___ ___ ___			Revised Bid		
M & D General Contractors		X	$342,025.45	$342,025.00	Math Error	
Kenney, Inc.						
HP Contracting		X	$335,234.00	$335,661.50	Math Error	
D & H Contracting Co., Inc.		X	$218,019.30			
Edward Hall Excavation		X	$278,651.00			
Wilmott Construction		X	$328,997.00			
Surface Treatment Products, Inc.						
Akins Excavating Co., Inc.		X	$281,680.40			
Alpha Reclamation		X	$368,169.50			
Perkins Excavating						
K. Carrender Construction		X	$352,993.85			

CERTIFY THAT THE ABOVE IS A TRUE AND ACCURATE TABULATION OF THE BIDS RECEIVED FOR THIS PROJECT ON THE ATE STATED ABOVE.

CMW, INC.

BY: _____

TABULATION OF BIDS

CMW, INC.
136 BIG HILL AVENUE
RICHMOND, KENTUCKY 40475

PROJECT Kirksville Water Association
Cuzick Water Line Extension

DATE December 8, 1998

CONTRACTORS	ADDENDA	BID BOND	TOTAL BID			
	___ ___ ___ ___ ___ ___					
Holbrook Excavation						
Anderson Cont.		X	$294,624.91			
Engineer's Estimate			$290,852.75			

I CERTIFY THAT THE ABOVE IS A TRUE AND ACCURATE TABULATION OF THE BIDS RECEIVED FOR THIS PROJECT ON THE DATE STATED ABOVE.

CMW, INC.

BY: Kim Dalle

CMW

December 14, 1998

Mr. Otis Bundy, President
Kirksville Water Association
P. O. Box 670
Richmond, KY 40476-0670

Re: Cuzick Water Line Extension
Kirksville Water Association

Dear Mr. Bundy:

I have reviewed all bids on this project and have found math errors on two bids which did not affect the outcome of the bid opening.

D & H Contracting Co., Inc. is the low bidder with a bid of $218,019.30. D & H Contracting Co., Inc. was the contractor for the Baldwin project and did a good job. Since Baldwin he has worked on numerous projects with recent work on a $400,000± contract with Richmond Utilities. Richmond Utilities has been pleased with his work.

I recommend that the contract for Cuzick water line extension be awarded to D & H Contracting Co., Inc. at the bid price of $218,019.30.

If you have any questions, give me a call.

Sincerely,

Kerry S. Odle, P. E.

KSO/jp

c: Tom Coffey
File

Part I. Unit Price Tabulation
Cuzick Water Line Extension
Kirksville Water

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	D & H Cont.	Ed Hall Exc.	Akins Exc.
1.	4" PVC Water Main, Class 200	33,769	LF	$3.20	$4	$4.10
2.	4" PVC Water Main, Class 250	650	LF	$3.40	$5.50	$5
3.	3" PVC Water Main, Class 200	13,065	LF	$2.90	$3.50	$3.90
4.	Connection to Existing Water Main	1	EA	$1,000	$850	$2,000
5.	4" MJ Gate Valve, Complete w/ Box and Cover	10	EA	$323	$350	$350
6.	3" MJ Gate Valve, Complete w/ Box and Cover	7	EA	$299	$325	$325
7.	4" MJ Gate Valve w/ Bypass Meter	3	EA	$656	$800	$2,000
8.	Air Relief Valve, Complete w/ Box and Cover	4	EA	$300	$325	$350
9.	Flush Hydrant, Complete w/ Gte Valve	15	EA	$700	$750	$1,200
10.	Bored and Jacked Encasement for 4" Water Main	155	LF	$58	$115	$80

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	D & H Cont.	Ed Hall Exc.	Akins Exc.
11.	Bored and Jacked Encasement for 3" Water Main	40	LF	$55	$105	$80
12.	Open Cut w/ PVC Encasement for 4" Water Main	20	LF	$15	$65	$30
13.	Concrete Encasement	20	CY	$200	$150	$100
14.	Extra Crushed Stone Bedding	100	TON	$15	$12	$10
15.	3/4" Polyethylene Service Line	1,670	LF	$3	$3.25	$3
16.	3/4" Polyethylene Service Line, Jacked Under Roadway	800	LF	$4.75	$15	$4
17.	1" Polyethylene Service Line	1,860	LF	$3.15	$3.50	$3.10
18.	1" Polyethylene Service Line, Jacked Under Roadway	30	LF	$5	$17	$4.10
19.	5/8" x 3/4" Meter Unit w/out Individual PRV	74	EA	$240	$275	$300
20.	5/8" x 3/4" Meter Unit w/ Individual PRV	1	EA	$300	$375	$350

Item No.	Anderson Cont.	Willmott Const.	HP Cont.	M & D Gen. Cont.	K. Carrender Const.	Alpha Reclamation
1.	$4.69	$5.50	$4.75	$5	$5.70	$5.50
2.	$4.90	$5.50	$5.60	$5.55	$8	$5.50
3.	$4.36	$4.50	$4.35	$4.50	$5.47	$5
4.	$1,798.45	$1,500	$1,925	$800	$1,000	$1,500
5.	$465	$350	$325	$465	$300	$600
6.	$421.07	$250	$300	$450	$300	$600
7.	$796.03	$750	$630	$650	$500	$1,000
8.	$246.43	350	$400	$850	$500	$500
9.	$920.82	$1,250	$1,200	$1,500	$850	$1,500
10.	$71.21	$65	$80	$45	$65	$80

Item No.	Anderson Cont.	Willmott Const.	HP Cont.	M & D Gen. Cont.	K. Carrender Const.	Alpha Reclamation
11.	$71.85	$60	$80	$44	$60	$80
12.	$14.85	$25	$30	$20	$50	$40
13.	$97.88	$150	$250	$225	$300	$80
14.	$10.10	$15	$16	$18	$15	$20
15.	$1.96	$2	$3.50	$4.50	$3	$5
16.	$5.25	$5	$9.50	$10	$10	$8
17.	$2.02	$2.25	$3.60	$5	$3.50	$5
18.	$5.40	$5	$10	$11	$10	$8
19.	$278.81	$300	$570	$450	$275	$400
20.	$312.36	$400	$600	$450	$350	$450

Place Kirksville Water Office
Date 12-7-98
Project No. 97459.02

BID

Proposal of D&H Contracting Co. INC. (hereinafter called "BIDDER"), a corporation organized and existing under the laws of the State of Kentucky doing business as A corporation*.

To the Kirksville Water Association (hereinafter called "OWNER").

Gentlemen:

The Bidder, in compliance with your invitation for bids for the construction of Cuzick Water Line Extension having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the contract documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within 150 consecutive calendar days thereafter as stipulated in the specifications. Bidder further agrees to pay as liquidated damages, the sum of $300 for each consecutive calendar day thereafter as hereinafter provided in Paragraph 15 of the General Conditions.

* Insert "a corporation", "a partnership", or "an individual" as applicable.

BIDDER acknowledges receipt of the following ADDENDUM:

NONE

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices:

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

(1) BIDS shall include sales tax and all other applicable taxes and fees.

(2) Breakdown of work is for general information. Any work shown on Drawings and/or specified but not listed below shall be included in total base bid. Cost of items of work not specifically described below may be added to related bid item(s) at bidder's discretion.

BID SCHEDULE

Part I. Base Bid

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	4" PVC WATER MAIN, CLASS 200	33,769	LF	$ 3.20	$ 108060.80
2	4" PVC WATER MAIN, CLASS 250	650	LF	$ 3.40	$ 2210.00
3.	3" PVC WATER MAIN, CLASS 200	13,065	LF	$ 2.90	$ 37,888.50
4.	CONNECTION TO EXISTING WATER MAIN	1	EA	$ 1000.-	$ 1000.-
5.	4" MJ GATE VALVE, COMPLETE W/ BOX AND COVER	10	EA	$ 323.-	$ 3230.-
6.	3" MJ GATE VALVE, COMPLETE W/ BOX AND COVER	7	EA	$ 299.-	$ 2093.-
7.	4" MJ GATE VALVE W BYPASS METER	3	EA	$ 656.-	$ 1968.-

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
8.	AIR RELIEF VALVE, COMPLETE W/ BOX AND COVER	4	EA	$ 300.-	$ 1200.-
9.	FLUSH HYDRANT, COMPLETE W/ GATE VALVE	15	EA	$ 700.-	$ 10,500.-
10.	BORED AND JACKED ENCASEMENT FOR 4" WATER MAIN	155	LF	$ 58.-	$ 8990.-
11.	BORED AND JACKED ENCASEMENT FOR 3" WATER MAIN	40	LF	$ 55.-	$ 2200.-
12.	OPEN CUT W/ PVC ENCASEMENT FOR 4" WATER MAIN	20	LF	$ 15.00	$ 300.-
13.	CONCRETE ENCASEMENT	20	CY	$ 200.-	$ 4000.-
14.	EXTRA CRUSHED STONE BEDDING	100	TON	$ 15.-	$ 1500.-
15.	3/4" POLYETHYLENE SERVICE LINE	1,670	LF	$ 3.00	$ 5010.-
16.	3/4" POLYETHYLENE SERVICE LINE, JACKED UNDER ROADWAY	800	LF	$ 4.75	$ 3800.-
17.	1" POLYETHYLENE SERVICE LINE	1,860	LF	$ 3.15	$ 5859.-
18.	1" POLYETHYLENE SERVICE LINE, JACKED UNDER ROADWAY	30	LF	$ 5.00	$ 150.00
19.	5/8" X 3/4" METER UNIT W/OUT INDIVIDUAL PRV	74	EA	$ 240.00	$ 17,760.-

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
20.	5/8" X 3/4" METER UNIT W/ INDIVIDUAL PRV	1	EA	$ 300-	$ 300-

TOTAL PART I (Base Bid) 218,019 30
(Use Figures)
two hundred eighteen thousand nineteen dollars thirty cents
(USE WORDS)

SUBTOTALS AND TOTAL AMOUNTS SHALL BE SHOWN IN BOTH WORDS AND FIGURES. IN CASE OF DISCREPANCIES, THE AMOUNT AS WRITTEN IN WORDS SHALL GOVERN.

The above price shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the General Conditions.

Award of the Contract will be based on the lowest and best Total Base Bid.

The Bidder agrees that the Owner reserves the right to delete the whole or any part of the project from the Contract.

The Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within ten (10) days and deliver a surety bond or bonds as required by the bid security attached in the sum of ten thousand nine hundred dollars ninety seven cents. $ 10,900 97 is to become the property of the Owner in the Event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

D&H Contracting Co. Inc.
(Name of Contracting Firm)

BY: Raymond Hauser

TITLE: PRESIDENT

ADDRESS: 2003 Lakeview Dr.

London, Ky. 40741

DATE: 12-7-98

License No. (if applicable)

Seal (If Bid by Corporation)

Attest: Tina Hauser

VI. Project Cost
Cuzick Water Main Extension

1.	Land and Right of Way	$500.00
*2.	Construction Cost	$335,500.00
3.	Engineering (from FmHA fee schedule)	$69,000.00
4.	Interest During Construction	$8,000.00
5.	Legal	$6,000.00
6.	Contingencies	$23,500.00
Total		$442,500.00

Funding Source

Rural Utility Service Loan	$102,300.00
Rural Utility Service Grant	$306,900.00
Applicant Contribution (74 meters @ $450/EA)	$33,300.00
Total	$442,500.00

*Includes water line construction, meters, and touch read meter system

Place Kirksville Water Office
Date 12-7-98
Project No. 97459.02

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D&H Contracting Co. Inc.
(Name of Contracting Firm)

BY: Raymond Heuser

TITLE: President

ADDRESS: 2003 Lakeview Dr.

London, Ky. 40741

DATE: 12-7-98

License No. (if applicable)

Seal (If Bid by Corporation)

Attest: Tama Heuser

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Total	$442,500.00

*Includes water line construction, meters, and touch read meter system

Kirksville Water Association, Inc.

P.O. Box 670
155 North Keeneland Drive
Richmond, Kentucky 40475
Phone: (606) 624-1735

I, Otis Bundy, President of Kirksville Water Association certify the following:

1) The proposed plans and specifications for the project have been designed to meet the minimum construction and operating requirements set out in 807 KAR 5:066, Section 4(3) and (4), Section 5, Section 6 and 7, Section 8(1) through (3), Section 9(1) and Section 10.

2) All other state approvals or permits have already been obtained.

3) No rate increase will be required to produce the total revenue requirements set out in engineering reports.

4) Construction on this project will begin by March 1, 1999 and end by August 30, 1999.

Otis Bundy

Otis Bundy, President

EXHIBIT E