COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF BRACKEN COUNTY WATER DISTRICT TO MODIFY THE FINAL ORDER OF CASE NO. 2015-00149 TO PERMIT USE OF PROCEEDS OF AN ASSISTANCE AGREEMENT WITH THE KENTUCKY INFRASTRUCTURE AUTHORITY FOR OTHER PURPOSES	)))))))	**CASE NO. 2016-00104**

APPLICATION

Pursuant to KRS 278.300 and KRS 278.390, Bracken County Water District ("Bracken District") applies to the Public Service Commission ("Commission") for an Order modifying the Commission's Order of June 17, 2015 in Case No. 2015-00149 to permit the use of the remaining proceeds of an Assistance Agreement with the Kentucky Infrastructure Authority ("KIA") for the construction of an interconnection between Bracken District and Western Mason County Water District.

In support of its Application, Bracken District provides the following:

1. Bracken District is a water district organized under KRS Chapter 74.

2. Bracken District's territory includes all unincorporated areas of Bracken County, Kentucky. It provides water service to Bracken County, Kentucky with the exception of the incorporated areas of Augusta and Brooksville, Kentucky.

3. Bracken District's mailing address is P.O. Box 201, Brooksville, Kentucky 41004-0201. Its email address is d.moran@brackencountywaterdistrict.com.

4. Bracken District not a corporation, limited liability company or partnership. It has no articles of incorporation or partnership agreements.

5. Bracken District was created by the merger of Bracken County Water District No. 1 and Western Bracken County Water District. A copy of the Orders of Bracken County Court creating Bracken County Water District No. 1 and Western Bracken County Water District is attached as **Exhibit 1** to this Application. A copy of the Commission's Order of May 11, 1995 in Case No. 95-068 in which the Commission approved the merger is attached as **Exhibit 2** to this Application. A copy of the Bracken County Executive Order 95-4 and a copy of Bracken Court Fiscal Court Order of January 12, 1996 in which the Bracken County Judge/Executive and Fiscal Court approved the merger and established the merged district's boundaries are attached as **Exhibits 3 and 4** respectively

6. A description of Bracken District's water system and its property, stated at original cost by accounts, is contained in Annual Report of Bracken County Water District to the Public Service Commission for the Year Ending December 31, 2014 ("2014 Annual Report"), a copy of which Bracken District has previously been filed with the Public Service Commission and which is incorporated by reference into this Application.

7. Bracken District does not propose to issue any stock or bonds.

8. On June 17, 2015, the Commission issued an Order in Case No. 2015-00149[1] in which it authorized Bracken District to enter into an Assistance Agreement with the Kentucky Infrastructure Authority ("KIA") to borrow no more than $359,000 to finance the KY 19 Master Meter to Kelly Ridge Water Main Replacement Project ("KY 19 Master Meter Project"). A copy of the Commission's Order is attached as **Exhibit 5** to this Application. The Commission limited Bracken District's use of the Assistance Agreement's proceeds to the construction of the KY 19 Master Meter Project.

[1] Case No. 2015-00149, *Application of Bracken County Water District for Authorization to Enter Loan Agreement With the Kentucky Infrastructure Authority* (Ky. PSC June 17, 2015).

9. Bracken District has completed construction of the KY 19 Master Meter Project and approximately $61,497.95 of the Assistance Agreement proceeds remain.

10. Bracken District proposes to use the remaining proceeds to construct an interconnection with Western Mason County Water District. This interconnection consists of the installation of 1,800 linear feet of six-inch polyvinyl chloride water main, a six-inch gate valve, a flushing hydrant, and a master meter vault.

11. Bracken District and Western Mason County Water District have entered into a Water Purchase Agreement in which both water utilities have agreed to provide water service to the other on an as-needed basis. This Agreement became effective January 30, 2016 and is on file with the Commission. A copy of this Agreement is attached as **Exhibit 6** to this Application.

12. Although the territories of Bracken District and Western Mason County Water District adjoin each other, there is currently no interconnection between the two water utilities.

13. The proposed interconnection provides for an emergency supply of water for the water districts and allows each water district to diversify its sources of water and to reduce its risk of water shortage or stoppage.

14. A copy of the plans for the proposed interconnection is attached to this Application as **Exhibit 7**.

15. A copy of the specifications for the proposed interconnection is attached to this Application as **Exhibit 8**.

16. A copy of the hydraulic calculations for the proposed interconnection is attached to this Application as **Exhibit 9**.

17. A description of the proposed interconnection's location is attached as **Exhibit 10** to this Application. A map depicting this location as **Exhibit 11**.

18. The Kentucky Division of Water ("KDOW") has reviewed the plans and specifications for the proposed interconnection and has approved them with respect to sanitary features of design. A copy of the letter in which the KDOW stated its approval and enclosed a copy of the construction permit for the proposed interconnection is set forth at **Exhibit 12** of this Application.

19. The KIA has granted Bracken District authorization to use the remaining loan proceeds to construct the interconnection. A copy of minutes of the KIA Board Meeting in which this authorization was granted is attached as **Exhibit 13** of this Application.

20. Total estimated cost of the proposed interconnection is $91,600. A copy of the preliminary engineering cost estimate is attached as **Exhibit 14** of this Application.

21. Bracken District proposes to use the remaining, unused funds from the KIA Assistance Agreement and internally generated funds to meet the cost of the proposed interconnection agreement.

22. The proposed interconnection will be performed using a change of construction work order to the original work order for the KY 19 Master Meter Project. A copy of the resolution of Bracken District's Board of Commissioners authorizing the issuance of a charge order to the KY 19 Master Meter Project and directing the construction to proceed is attached to this Application as **Exhibit 15**.

23. No real property will be acquired with remaining proceeds from the Assistance Agreement.

24. None of the remaining proceeds from the Assistance Agreement will be used to refund outstanding obligations.

25. A copy of Bracken District's written notification to the state local debt officer for the KIA Assistance Agreement was filed in Case No. 2015-00149 and is attached as **Exhibit 16** to this Application.

26. For the 12-month period ending December 31, 2014, Bracken District had less than $5,000,000 in gross annual revenues.

27. Pursuant to 807 KAR 5:001, Section 18(2)(a), a financial exhibit containing the following information is provided:

a. Bracken District's 2014 Annual Report is incorporated by reference into this Application. Bracken District also incorporates into this Application its audited financial statements for the years ending December 31, 2014, which have previously been filed with the Commission.

b. With the exception of the execution of the Assistance Agreement that the Commission approved in Case No. 2015-00149, no material changes have occurred in Bracken District's financial condition since December 31, 2014.

c. Bracken District is not authorized to issue any stock nor has it issued any stock.

d. There are no trust deeds or mortgages applicable.

e. Maps and plans of the proposed construction are found at **Exhibit 11** of this Application.

f. A detailed estimate of the acquired property, arranged according to the Uniform System of Accounts for Class A/B Water Districts and Associations, is attached to this Application as **Exhibit 17**.

28. In addition to the documents attached to this Application, Bracken District incorporates into this Application by reference all documents contained in the record of PSC Case No. 2015-00149.

29. The proposed interconnection does not require a Certificate of Public Convenience and Necessity. As Bracken District is a Class A Water District,[2] as the proposed project is a water line improvement project that costs less than $500,000, and as Bracken District does not propose to increase its rates as a result of the proposed project, Chapter 117 of the 2014 Kentucky Acts exempts the proposed project from the requirement to obtain a Certificate of Public Convenience and Necessity.[3]

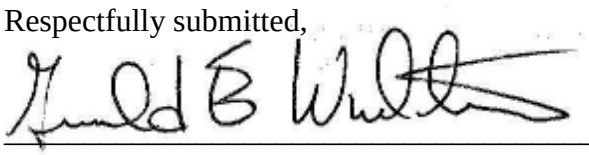
WHEREFORE, Bracken District requests that the Commission issue an Order within 30 days of the date of the acceptance of this Application for filing that authorizes Bracken District to use the remaining proceeds from the Assistance Agreement for the cost of constructing the proposed interconnection.

[2] The Kentucky Public Service Commission's Uniform System of Accounts defines a Class A water utility as a utility "having annual water operating revenues of $750,000 or more." Uniform System of Accounts for Class A and B Water Districts and Associations at 14 (2002) (found at http://psc.ky.gov/agencies/psc/forms/usoa/0700ab02.pdf). The average of Bracken District's annual operating revenues for the last three years for which an annual report has been filed with the Kentucky Public Service Commission is $1,525,113.

[3] Water Districts and Water Associations: A water district created pursuant to KRS Chapter 74 and a water association formed under KRS Chapter 273 that undertakes a waterline extension or improvement project shall not be required to obtain a certificate of public convenience and necessity, notwithstanding KRS 278.020(1), if the water district or water association is a Class A or B utility as defined in the Uniform System of Accounts established by the Public Service Commission, pursuant to KRS 278.220, as the system of accounts prescribed for utilities in Kentucky, and either: (a) The water line extension or improvement project will not cost in excess of $500,000; or (b) The water district or water association will not, as a result of the water line extension or improvement project, incur obligations requiring Public Service Commission approval pursuant to KRS 278.300. In either case, the water district or water association shall not, as a result of the water line extension or improvement project, increase rates to its customers.

Dated: March 17, 2016

Respectfully submitted,



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gerald.wuetcher@skofirm.com

Counsel for Bracken County Water District

COMMONWEALTH OF KENTUCKY)
) SS
COUNTY OF BRACKEN)

The undersigned, Anthony Habermehl, being duly sworn, deposes and states that he is the Chairman of Bracken County Water District, the Applicant in the above proceedings; that he has read this Application and has noted its contents; that the same is true of his own knowledge, except as to matters which are therein stated on information or belief, and as to those matters, he believes same to be true.

IN TESTIMONY WHEREOF, witness the signature of the undersigned on this March 16, 2016.

Anthony Habermehl
Chairman
Bracken County Water District

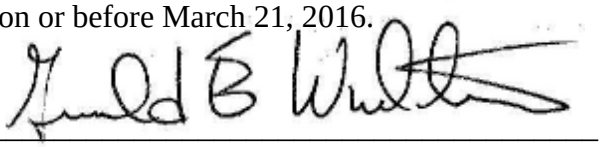
Subscribed and sworn to before me by Anthony Habermehl, Chairman, Bracken County Water District, on this March 16, 2016.

My Commission expires: 4/3/18.

Diana Moran
Notary Public

CERTIFICATE OF SERVICE

In accordance with 807 KAR 5:001, Section 8, I certify that Bracken District's March 17, 2016 electronic filing of this Application is a true and accurate copy of the same document being filed in paper medium; that the electronic filing has been transmitted to the Commission on March 17, 2016; that there are currently no parties that the Commission has excused from participation by electronic means in this proceeding; and that an original paper medium of the Application will be delivered to the Commission on or before March 21, 2016.



Gerald E. Wuetcher

EXHIBITS

TABLE OF EXHIBITS

Exhibit No.	Description
15	A Resolution of the Board of Commissioners of Bracken County Water District Authorizing the Construction of An Interconnection with Western Mason County Water District and Application of the Remaining Proceeds From Kentucky Infrastructure Authority Assistance Agreement (B15-002) Towards the Cost of That Construction
16	Notice to State Local Debt Officer
17	Detailed Estimate of Acquired Property, Arranged According to the Uniform Systems of Accounts for Class A/B Water Districts and Associations

EXHIBIT 1

DERS } Bracken County COURT

Term, Day, 15 Day of Sept. 19 60

Snow S. Co. Louisville, Ky 0 - 7

STATE OF KENTUCKY
BRACKEN COUNTY COURT,
SEPT. 15, 1960

THE MATTER OF BRACKEN COUNTY WATER DISTRICT NO. 1

ORDER CREATING DISTRICT

It appearing to the Court upon hearing on this date in the above styled tter, that a petition in writing has been made to this Court for the establish- it and creation of a Water District to include the premises more fully scribed hereinafter, said petition being signed by more than seventy-five eeholders thereof and setting out the reasons therefor, and it appearing it notice of the filling of said petition has been given by publication as uired by by law, and it further appearing that the establishment of the ter District is necessary to the public heatlh, convenience, fire protection l comfort to the residents of the proposed Water District:

NOW THERE FORE, it is ordered and adjudged that the establishment of proposed Water District is necessary for the public health, convenience, e protection and comfort of the residents of the proposed district, and is further ordered that a Water District, known as the Bracken County er District No. 1 be, and is hereby created and established, consisting the following property.

DESCRIPTION OF PROPOSED BRACKEN COUNTY WATER DISTRICT NO. 1

that land lying in Bracken County, Kentucky, and more particularly de- ibed as follows:
INN ING at the intersection of the Western property line of C. P. Dimmitt h the South Right of way line of Kentucky State Highway No. 10; thence allel to the Mason County Line a distance of 4.1 miles; thence due North the South R/W Line of the C & O Railway an approximate distance of 4.8 es: thence in a westerly direction with said Railway Company line, a dis- ice of 9.0 miles; thence due South a distance of 7.0 miles; thence due theast a distance of 3.6 miles; thence due Southeast a distance of 2.6 es; thence due Northeast a distance of 3.4 miles; thence due East a dis- ice of 5.3 miles; thence parallel to the Mason County line an approximate tance of 0.95 miles to the point of beginning; but excluding therefrom incorporate cities of Augusta and Brooksville.

ERED THAT COURT BE ADJOURNED

Edward B. Voss JUDGE.
Bracken County Court

COURT WAS ADJOURN'D

STATE OF KENTUCKY
BRACKEN COUNTY COURT
SEPTEMBER COUNTY COURT
SEPTEMBER 15, 1960

IN MATTER OF WESTERN BRACKEN COUNTY
WATER DISTRICT

ORDER CREATING DISTRICT

It appearing to the Court upon hearing on this date in the above styled matter, that a petition in writing has been made to this Court for the establishment and creation of a Water District to include the premises more fully described hereinafter, said petition being signed by more than seventy-five freeholders thereof and setting out the reasons therefor, and it appearing that notice of the filling of said petition has been given by publication as required by law, and it further appearing that the establishment of the Water District is necessary to the public health, convenience, fire protection and comfort to the residents of the proposed Water District.

NOW THEREFORE, it is ordered and adjudged that the establishment of the proposed Water District is necessary for the public health, convenience, fire protection and comfort of the residents of the proposed district, and it is further ordered that a water district, known as the Western Bracken County Water District be, and is hereby created and established, consisting of the following property.

DESCRIPTION OF PROPOSED BOUNDARY
WESTERN BRACKEN COUNTY WATER DISTRICT

A ll that land lying in the Western part of Bracken County, Kentucky, and more particularly described as follows:

Beginning at the intersection of the Pendleton County Line, the Bracken County Line and the Southern Boundary line of the State of Ohio on the North Bank of the Ohio River, thence with the Pendleton County Line in a Southerly direction an approximate distance of 15.2 miles, thence due East an approximate distance of 4.0 miles to the center line of Kentucky State Highway No. 19, near Petra, thence North 45 deg. 00 Min. West 1.55 miles, thence North 45 deg. 00 Min. East 3.6 miles, thence due north an approximate distance of 7.7 miles to the Southern Boundary of the State of Ohio (the North Bank of the Ohio River) thence following the Southern Boundary of the State of Ohio to the point of beginning.

JUDGE

STATE OF KENTUCKY
BRACKEN COUNTY COURT
SEPTEMBER 1960

IN THE MATTER OF WESTERN BRACKEN COUNTY WATER DISTRICT

Order of Appointment of Commissioners

The Western Bracken County Water District having been established by County Court this 15 day of Sept.,1960, this Court does hereby appoint under the provisions of KRS 74.020, three water district Commissioners, all of whom are now residents of the said Water District, the names, addresses and length of terms of these Commissioners of the District being as follows:

Name	Addresses	Length of Term
Jesse B. Feagan	Foster,Ky. R.R.2	2 years
Fonzie Morris	Foster,Ky. R.R.1	3 years
Lavrence Lenox	Foster,Ky. R.R.2	4 years

Each of the above commissioners shall receive an annual salary of One Hundred Dollars to be paid only from funds of the said Water District.

Each Commissioner shall execute bond in the amount of One Hundred ($100.00) Dollars, said bond to be approved by this Court and shall be sworn to faithfully perform duties of his position.

JUDGE

EXHIBIT 2

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF BRACKEN COUNTY WATER DISTRICT NO. 1 AND WESTERN BRACKEN WATER DISTRICT FOR APPROVAL OF THE MERGER OF BRACKEN COUNTY WATER DISTRICT NO. 1 AND WESTERN BRACKEN WATER DISTRICT	))))))	CASE NO. 95-068

O R D E R

On February 17, 1995, Bracken County Water District No. 1 ("Bracken") and Western Bracken Water District ("Western Bracken") (hereinafter "Joint Applicants"), pursuant to KRS 74.363, filed with the Commission an application ("Joint Application") wherein they sought authorization to merge into a single water district to be known as Bracken County Water District ("Merged District"). On March 9, 1995, Joint Applicants filed an amendment to their original application ("Amendment") wherein they stated, inter alia, that all current employees of Joint Applicants will be retained subsequent to the merger and that rates within the areas currently served by Bracken and Western Bracken will not change when the merger takes place.[1] On March 10, Joint Applicants filed their

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[1] KRS 74.363 states, in pertinent part, that

> ...obligations of any district secured by the right to levy an assessment as provided by KRS 74.130 through 74.230 or secured by the revenue of the systems operated by the district shall continue to be retired or a sinking fund for such purpose created from the tax assessments or revenue from the system operated by the district from funds collected over the same area by the new board of commissioners in accordance with the laws under which the bonds were issued until all bonded obligations of the old district have been retired.

In order to comply with this mandate, the Merged District shall establish for rate-making and accounting purposes a Bracken County Water District Division No. 1 and a Bracken County Water District Division No. 2 [Merger Agreement, at 3].

executed Merger Agreement dated March 7, 1995 ("Merger Agreement"). Appended to the Merger Agreement as Appendix A and Appendix B, respectively, are copies of the minutes of meetings of Western Bracken and Bracken during which the proposed merger was approved.

Both Bracken and Western Bracken are water districts pursuant to KRS Chapter 74, and both provide water service in Bracken County, Kentucky. Both Bracken and Western Bracken are utilities within the definition of KRS 278.010(3) and are subject to the jurisdiction of the Commission.

Section (1) of KRS 74.361 sets forth the purposes of merger, stating in pertinent part,

> The general assembly of the Commonwealth of Kentucky determines as a legislative finding of fact that reduction of the number of operating water districts in the Commonwealth will be in the public interest, in that mergers of such districts will tend to eliminate wasteful duplication of costs and efforts, result in a sounder and more businesslike degree of management, and ultimately result in greater economies, less cost, and a higher degree of service to the general public; and that the public policy favors the merger of water districts whenever feasible.

The Boards of Water Commissioners of Bracken and Western Bracken have determined that the proposed merger is in the public interest in that it will result in economies of scale, lower operating costs and, ultimately, lower retail water rates [Merger Agreement, at 1].

Joint Applicants submit that the Merged District shall initially be governed by a Board of Water Commissioners consisting of the present Commissioners of Bracken and Western Bracken for a

period of at least one but not more than three years, after which the number of Commissioners shall be reduced to three as the respective terms of the incumbent Commissioners expire. As the terms of the incumbent Commissioners expire, the County Judge Executive shall appoint successors as provided in KRS 74.363 and KRS 74.020.

KRS 74.363 requires that the Merged District assume all assets and legal liabilities of the utilities joining in the merger. Joint Applicants submit that the Merged District will assume all such obligations and assets.

Joint Applicants do not presently propose any change in their basic operations other than the merger of Bracken and Western Bracken.

IT IS THEREFORE ORDERED that:

1. Joint Applicants' request for authorization to merge Bracken County Water District No. 1 and Western Bracken Water District into a single district is approved.

2. Within 10 days of the consummation of the proposed merger, Joint Applicants shall notify the Commission that the merger has taken place or, in the alternative, shall notify the Commission if the proposed merger does not occur.

3. Within 30 days after the consummation of the merger, Joint Applicants shall file with the Commission documentation memorializing the assumption by the Merged District of all assets and liabilities specified in KRS 278.363.

4. Within 30 days of the consummation of the merger, Joint Applicants shall file with the Commission the journal entries for each participating utility reflecting the merger.

5. Within 30 days of the consummation of the merger, Joint Applicants shall file a balance sheet for the Merged District.

6. The Merged District shall maintain separate accounting procedures as necessary to ensure that all bonded obligations of Bracken and Western Bracken will be retired as specified in KRS 74.363.

7. Within 10 days of the consummation of the merger, Joint Applicants shall file an Adoption Notice pursuant to 807 KAR 5:011, Section 11.

8. Within 10 days of its filing of the Adoption Notice, Joint Applicants shall file a tariff for the Merged District.

Done at Frankfort, Kentucky, this 11th day of May, 1995.

PUBLIC SERVICE COMMISSION

Chairman

Vice Chairman

Commissioner

ATTEST:

Executive Director

EXHIBIT 3

COUNTY CLERK'S OFFICIAL CERTIFICATE

STATE OF KENTUCKY
COUNTY OF BRACKEN } Sct.

I, Karen Rumford, Clerk of the County Court within and for the County and State aforesaid, do certify that the foregoing 1 pages contain a true, correct and complete copy of Executive Order 95-4

that is attached, as the same is now of record in my office at Clerk aforesaid.

Whereas the same remains in full force and effect.

Said Executive Order is recorded in Co. Executive Order Book No. 2 Page 606 County Clerk's office, aforesaid.

In Testimony Whereof, and that the foregoing Exective Order truly and completely copied from the records of the Court aforesaid, I, Karen Rumford, Clerk of said Court, hereunto set my hand and affix the official seal of Bracken County, Kentucky, of which I am the custodian, at Brooksville, Kentucky this 7 day of September, 1995.

Karen Rumford, Clerk
Bracken County Court, KY

By _____, D.C.

COPY

BRACKEN COUNTY, KENTUCKY

EXECUTIVE ORDER 95-4

Public notice having been given and a public hearing held August 30, 1995, at 10:00 A.M. and 12 people being in attendance at said meeting, none of whom registered any objection to the merger of Bracken County Water District #1 with Western-Bracken Water District and none of whom registered any complaint regarding the redefining of boundaries for the merged District;

IT IS HEREBY ORDERED that the merger of the districts is approved and the merged water district, to be known as **Bracken County Water District**, shall have boundaries co-extensive with the boundaries of Bracken County, excluding only that territory within the City limits of the City of Brooksville, Kentucky, and the City of Augusta, Kentucky.

It is further noted that the merger of the two districts to form one district was approved by the P.S.C. vis a vis the Order of the Commission, dated 5-11-95. (copy attached)

September 7, 1995
DATE

J. Wayne Hatt
JUDGE-EXECUTIVE
BRACKEN COUNTY, KENTUCKY

ATTEST: Ann Reynolds
BRACKEN COUNTY CLERK

EXHIBIT 4

ORDER

An order approving the merger of Bracken County Water District #1 and Western Bracken Water District into one single water district to be known as Bracken County Water District, defining terms of commissioners, setting payment to commissioners and defining area to be served.

Whereas, by previous order of Bracken County Fiscal Court entered 9/15/60 (see Order Book 5, pages 494, 495, 496 & 498) there were created two water districts under authority of KRS Chapter 74, to wit: Western Bracken County Water District and Bracken County Water District #1 and,

Whereas, said districts have operated independently, and

Whereas, said districts have agreed to merge in order to better and more economically serve the citizens of Bracken County in light of Federal and State regulatory mandates which demand extensive expense by the District for personnel, testing, physical plant, record keeping, etc., etc., some of which expense can be decreased by eliminating duplication in some areas of said expense, and,

Whereas, the Public Service Commission and the other applicable regulatory agencies have approved said merger and

Whereas, over the years the fiscal court and County Judge have confused the correct dates of commissioner's appointments which are important at this point because all

commissioners now holding office shall remain in office until the end of his term (per KRS 74.361), and

Whereas, the merger was previously approved per KRS Chapter 74, (see Executive Order #95-4)

NOW THEREFORE, IT IS HEREBY ORDERED that

1) The merger of Western Bracken Water District and Bracken County Water District #1 is recognized and accepted as set out at Executive Order #95-4, which order includes the description of the merged district which is adapted herein by reference and ratified hereby

2) Terms of commissioners, all of which were and are appointed by the Judge/Executive and were and are hereby approved by the fiscal court, as follows:

Charles Tarvin	September 15, 1996
Jacob Bauer	September 15, 1996
Edward B. Kern	September 15, 1998
Roy Reed	September 15, 1998
Wesley Jones	September 15, 1999
Baxter Courts	September 15, 1999

3) Annual payment for each commissioner, to be paid from funds of the water district is hereby set at $1,800.00 effective 1/1/96.

NOTE: The Court suspends its rule regarding the waiting period for a vote due to the fact that the merger was finalized December 27, 1995 and the above order is needed at once to provide for orderly administration of the merged District.

1-12-96
Date

Wayne Tatt
Judge Executive

EXHIBIT 5

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF BRACKEN COUNTY WATER DISTRICT FOR AUTHORIZATION TO ENTER LOCAL AGREEMENT WITH THE KENTUCKY INFRASTRUCTURE AUTHORITY	))))	CASE NO. 2015-00149

ORDER

On May 21, 2015, Bracken County Water District ("Bracken County") applied to the Commission for approval to enter into an Assistance Agreement with the Kentucky Infrastructure Authority ("KIA") to borrow approximately $358,000 for a Water Main Replacement Project.

Having considered the record and being otherwise sufficiently advised, the Commission finds that:

1. Bracken County proposes to execute an assistance agreement with KIA to borrow a sum no greater than $358,000. The proposed loan will have a 20-year term subject to an interest rate of 1.75 percent.[1]

2. Bracken County proposes to use the proceeds from the Assistance Agreement to finance the KY 19 Master Meter to Keely Ridge Water Main Replacement Project. The proposed project involves the replacement of approximately 8,500 feet of four-inch asbestos cement water main from KY 19 to Keely Ridge Road.

[1] Application, Exhibit 5.

3. Given that Bracken County is classified as a Class B Water District, the proposed project is for water line improvements that will cost less than $500,000, and Bracken County will not increase its general rates as a result of the proposed project, Chapter 117 of the 2014 Kentucky Acts[2] exempts Bracken County from the requirement to obtain a Certificate of Public Convenience and Necessity for its project.

4. Bracken County's proposed loan is for a lawful object within its corporate purposes, is reasonably necessary and appropriate for and consistent with the proper performance of its service to the public, will not impair Bracken County's ability to perform that service, and is reasonably necessary and appropriate for such purpose.

IT IS THEREFORE ORDERED that:

1. Bracken County is authorized to enter into an agreement with KIA to borrow no more than $358,000 for the purpose of the KY 19 Master Meter to Keely Ridge Water Main Replacement Project outlined in its Application.

2. Within 30 days of executing the proposed agreement, Bracken County shall file a copy of the executed Assistance Agreement, and any documents referenced in the executed Assistance Agreement, that Bracken County has not previously filed with the Commission.

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[2] Water Districts and Water Associations: A water district created pursuant to KRS Chapter 74 and a water association formed under KRS Chapter 273 that undertakes a waterline extension or improvement project shall not be required to obtain a certificate of public convenience and necessity, notwithstanding KRS 278.020(1), if the water district or water association is a Class A or B utility as defined in the Uniform System of Accounts established by the Public Service Commission, pursuant to KRS 278.220, as the system of accounts prescribed for utilities in Kentucky, and either: (a) The water line extension or improvement project will not cost in excess of $500,000; or (b) The water district or water association will not, as a result of the water line extension or improvement project, incur obligations requiring Public Service Commission approval pursuant to KRS 278.300. In either case, the water district or water association shall not, as a result of the water line extension or improvement project, increase rates to its customers.

3. The proceeds from the Assistance Agreement shall be used only for the lawful purposes specified in Bracken County's Application.

4. Any documents filed pursuant to ordering paragraph 2 of this Order shall reference the number of this case and shall be retained in the utility's general correspondence file.

Nothing contained herein shall be construed as a finding of value for any purpose or as a warranty on the part of the Commonwealth of Kentucky or any agency thereof as to the securities authorized herein.

By the Commission

ENTERED
JUN 17 2015
KENTUCKY PUBLIC
SERVICE COMMISSION

ATTEST:

Executive Director

EXHIBIT 6

WATER PURCHASE AGREEMENT

This Water Purchase Agreement (the "Agreement") is made and entered into as of the 21 day of Dec., 2015, by and between the **WESTERN MASON COUNTY WATER DISTRICT** ("Seller"), P.O. Box 49, Dover, Kentucky 41034, and the **BRACKEN COUNTY WATER DISTRICT** ("Purchaser"), P.O. Box 201, 1324 Brooksville Germantown Road, Brooksville, Kentucky 41004.

WITNESSETH:

WHEREAS, the Seller is a non-profit water district organized under the provisions of KRS Chapter 74;

WHEREAS, the Purchaser is a non-profit water district organized under the provisions of the KRS Chapter 74;

WHEREAS, by a Resolution duly adopted on December 21, 2015 by the Board of Commissioners of the Seller, this Agreement was approved and the Seller's Chairman was authorized to execute this Agreement for and on behalf of the Seller; and

WHEREAS, by a Resolution duly adopted on December 16, 2015, by the Board of Commissioners of the Purchaser, this Agreement was approved and the Purchaser's Chairman was authorized to execute this Agreement for and on behalf of the Purchaser.

NOW THEREFORE, in consideration of the foregoing and the mutual terms and conditions contained herein, the Seller and Purchaser (collectively "the Parties") agree as follows:

1. Term of Agreement. The term of this Agreement is for a period of 20 years, commencing on the Effective Date hereof as provided in paragraph 16, unless otherwise extended or modified by the Parties' written agreement or terminated pursuant to the terms of this Agreement.

2. Quantity of Water. The Seller shall furnish to the Purchaser, at the specified point of delivery, such quantity of water as the Purchaser may require, but not to exceed an amount which, when combined with the usage of the Seller's other customers, would exceed the Seller's water production capacity. In the event of an emergency the Purchaser shall furnish to the Seller such quantity of water as the Seller may require, but not to exceed an amount which, when combined with the usage of the Purchaser's other customers, would exceed the total quantity of water available to the Purchaser from its other water supply sources.

3. Minimum Purchases. The Purchaser shall not be obligated to purchase a minimum quantity from the Seller.

4. Quality of Water. The Seller shall furnish to the Purchaser, at the point of delivery hereinafter specified, during the term of this Agreement, or any renewal or extension thereof, potable, treated water meeting the applicable water quality standards of all appropriate state and federal regulatory agencies.

5. Operation of System. The Seller shall, at all times, operate and maintain its water system in an efficient manner and shall take such action as may be reasonably necessary to perform its obligations under this Agreement. Temporary or partial failures to deliver water shall be remedied diligently with all practicable dispatch. The Seller shall immediately inform the Purchaser by telephone, email, or facsimile transmission of the nature and extent of such failure to deliver water. The Purchaser agrees to take such actions as may be reasonably necessary to curtail water usage within its system in response to a shortage of water.

6. Delivery Point. The Seller shall deliver the water to the Purchaser at the Germantown Master Meter ("point of delivery"), which is located on Kentucky Highway 10 at a point approximately 40 feet south of the centerline of Kentucky

Highway 10 and near the common property line of Donald Mains, et ux. and Darrell and Jeff Williams;

The water shall be furnished at the point of delivery at a minimum pressure of seventy (70) pounds per square inch. The Seller shall use reasonable care and diligence in the operation and maintenance of its water system to prevent and avoid interruptions and fluctuations of supply and pressure. Should greater pressures than that available at the point of delivery be required by the Purchaser, it shall be Purchaser's responsibility, at its own expense, to provide within its system such booster pumping, storage or other facilities as may be required to develop and maintain additional pressures within the Purchaser's system.

Emergency failures of water supply due to main supply line breaks, power failure, flood, fire and use of water to fight fire, earthquake, or other catastrophe shall excuse the Seller from this provision for such reasonable period of time as may be necessary to restore service.

7. Metering Equipment. The Purchaser shall furnish, install, own, operate and maintain at its own expense the necessary metering equipment to reliably measure the quantity of water delivered to the Purchaser and shall test such metering equipment annually. The Purchaser shall provide notice to Seller at least 24 hours prior to conducting any meter tests, allow Seller access to the metering

site during testing, and submit test results to the appropriate official designated by the Seller. A meter registering within the acceptable limits set forth in 807 KAR 5:006 and 807 KAR 5:066 shall be deemed to be accurate. Previous readings of any meter disclosed by test results to be inaccurate (registering outside of acceptable limits established by 807 KAR 5:006 and 807 KAR 5:066) shall be adjusted for the six-month period previous to the test in accordance with the percentage of inaccuracy found by such test. Billings for the period shall be recalculated and the Purchaser's account credited or charged accordingly. If any meter fails to register usage for any period, the amount of water furnished during such period shall be estimated by any reasonable means agreeable to the Purchaser and Seller. The metering equipment shall be read on or about the **10th** day of each month, or any other day mutually agreed upon. An appropriate official of the Purchaser and Seller shall have access to the master meter for the purpose of collecting usage data and verifying the master meter's readings.

8. Telemetry. The Purchaser and Seller may each install at its own expense, telemetry equipment at the point of delivery to enable it to remotely read the master meter. Each party hereby consents to such installations at the point of delivery provided adequate space exists and the telemetry equipment does not pose a safety hazard. Neither the Purchaser nor the Seller is obligated to install telemetry equipment at the point of delivery, but if it elects party

installing such equipment shall be responsible for all costs associated with the installation, operation and maintenance of the telemetry equipment. Ownership of the telemetry equipment shall remain vested in the party installing such equipment. Neither party shall install telemetry equipment at the point of delivery, however, without first presenting a drawing or illustration of the proposed telemetry equipment to the other party, who, shall promptly review the proposed installation and determine if adequate space exists at the point of delivery and if the telemetry equipment is likely to pose a safety hazard.

9. Billing and Payment Procedure. The Seller shall furnish the Purchaser at the above address, not later than the **first** business day of each month, an itemized statement of the amount and cost of water furnished the Purchaser at the delivery point during the preceding billing cycle. The Purchaser shall pay those charges not later than the **10th** day of each month. Any amount unpaid after the due day shall be subject to a 10 percent late payment fee.

10. Cost Based Rates. The Seller shall establish and adjust, from time to time, the wholesale rate based upon the Seller's actual cost of providing water service to the point of delivery described in paragraph 6 of this Agreement.

11. Initial Rate Schedule. The initial wholesale rate shall be **$1.83** per 1,000 gallons.

12. Billing Credit. The Purchaser assumes responsibility for the total project cost to construct the interconnection. The Seller, however, recognizes that the interconnection will benefit its distribution system by providing an emergency supply of potable water and agrees to reimburse the Purchaser for fifty (50) percent of the project cost of the interconnection through a billing credit. Seller will provide a billing credit of $0.50 per 1,000 gallons to the Purchaser for its water purchases until the total of such credits equals fifty (50) percent of the total project cost upon completion. At the time of completion of the interconnection, the project engineer will provide written notice of the total project cost to the Purchaser and Seller.

The Purchaser and Seller recognize that the Seller may use the interconnection to supply the Seller's distribution system in an emergency that arises from a catastrophic system failure of power failure, line break, or other situation that creates a loss of pressure to the Seller's customers. If the Seller takes water through the interconnection in an emergency, all water will be metered and the Seller will reduce the volume of water for which the Purchaser is billed on the Purchaser's next monthly bill by an amount equal to the volume that the Seller took through the interconnection. If the Purchaser's usage through the interconnection does not equal or exceed the volume that the Seller has taken for the month in question, then the Seller shall reduce the vo[illegible] the

following months until the total amount taken by the Seller through the interconnection has been deducted from the Purchaser's billed usage.

13. Rate Modification. Commencing one year after the effective date of this Agreement, the Seller, may on an annual basis, adjust or modify the volumetric rate set forth in paragraph 11 of this Agreement, to reflect changes in the Seller's cost of providing water service to the Purchaser. Any change in the wholesale rate shall be based on a demonstrable change in the costs of performance hereunder.

14. Effective Date of Rate Modification. No proposed adjustment or modification to the existing wholesale rate shall take effect earlier than 30 days after the date that Seller has filed notice of the proposed adjustment or modification with the Kentucky Public Service Commission ("KPSC"). Seller shall provide Purchaser with notice of the proposed adjustment of the wholesale rate no later than the date on which it files notice of the proposed adjustment with the KPSC.

15. Termination. On and after December 21, 2035, the Purchaser and/or Seller may terminate this Agreement with 60 days advance, written notice to the Seller and/or Purchaser. If written notice is not provided then the Agreement shall automatically continue. This Agreement may be terminated prior to the earlier established date upon written notice and agreement by b

KENTUCKY
PUBLIC SERVICE COMMISSION
JEFF R. DEROUEN
EXECUTIVE DIRECTOR
TARIFF BRANCH
Brent Kirtley
EFFECTIVE
1/30/2016
PURSUANT TO 807 KAR 5:011 SECTION 9 (1)

16. Effective Date. The Parties acknowledge that this Agreement shall become effective 30 days after its filing with the KPSC, or if the KPSC suspends operation of this agreement for further review, upon an Order of the KPSC approving the Agreement. The Seller shall give written notice of the Effective Date to the Purchaser.

17. Indemnification. Each Party shall be solely responsible for the construction, operation, and maintenance of its respective water system. Each Party, to the extent permitted by law, expressly agrees to indemnify, save harmless and defend the other Party against all claims, demands, cost, or expense asserted by third parties and proximately caused by the negligence or willful misconduct of such indemnifying Party in connection with the construction, operation, and maintenance of its respective water system.

18. Regulatory Agencies. This Agreement is subject to the laws of the Commonwealth of Kentucky. The Seller and Purchaser shall collaborate in obtaining any permit, approval, or certificate as may be required to comply therewith.

19. Successors and Assigns. This Agreement shall inure to the benefit of and be binding upon the Parties and their respective successors and assigns. This Agreement shall not be assigned by either Party without the w[illegible]of the

other Party, which consent shall not be unreasonably withheld, unless such assignment or transfer is to a successor in the operation of its properties by reason of a merger, consolidation, sale or foreclosure where substantially all such properties are acquired by such a successor empowered by law and financially able to effect the purposes of this Agreement which it must assume and, thereafter, be exclusively responsible for the performance of the terms of this Agreement to be performed by either Party hereunder.

20. This Agreement constitutes the entire agreement of the parties and all prior conversations and writings are merged into this Agreement.

21. This Agreement shall be construed according to the laws of the Commonwealth of Kentucky.

[Remainder of this page intentionally left blank]

IN WITNESS WHEREOF, the Parties hereto, acting under authority of their respective governing bodies, have caused this Agreement to be duly executed in multiple counterparts, each of which shall constitute an original.

SELLER:

Western Mason County Water District, Dover, Kentucky

Larry Redden, Chairman

Attest:

PURCHASER:

Bracken County Water District

Anthony Habermehl, President

Attest:

Diana Moran

KENTUCKY
PUBLIC SERVICE COMMISSION
JEFF R. DEROUEN
EXECUTIVE DIRECTOR
TARIFF BRANCH
Brent Kirtley
EFFECTIVE
1/30/2016
PURSUANT TO 807 KAR 5:011 SECTION 9 (1)

EXHIBIT 7

Contract No.2

3380SAPE20150002
0120039-15-002

KY 10 INTERCONNECT to WESTERN MASON WATER DISTRICT

for the

BRACKEN COUNTY WATER DISTRICT

Brooksville, Kentucky

September 2015

COMMISSIONERS:

ANTHONY HABERMEHL - CHAIRMAN
DALE APPELMAN
BAXTOR COURTS
EDDIE KERN
TIMOTHY SWEENEY
DIANA MORAN - OFFICE MANAGER
MICHAEL BROTHERS - FIELD MANAGER

RECEIVED
NOV 09 2015
WIB

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

11/2/15

PROJECT NO. 14050

SET NO. _____

IT IS A VIOLATION OF LAW FOR ANY PERSON TO ALTER THIS DRAWING WITHOUT WRITTEN PERMISSION FROM KENTUCKY ENGINEERING GROUP, PLLC AND ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE DRAWING OR TITLE BLOCK TO DETERMINE THE ACTUAL SCALE.

NO.	DATE	REVISIONS	BY

DATE:	SEPTEMBER 2015
PROJECT MGR:	LRS/PBR
DRAWN BY:	CDS
CHECKED BY:	LRS/PBR
SCALE:	AS NOTED

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

Contract No.2

KY 10 INTERCONNECT TO WESTERN MASON WATER DISTRICT

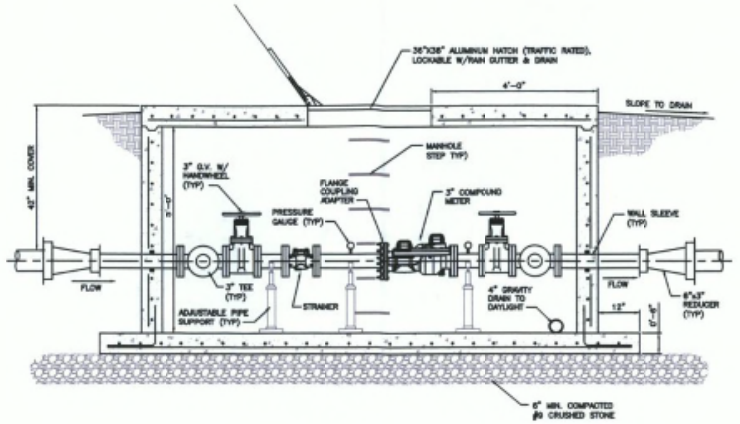
for the

BRACKEN COUNTY WATER DISTRICT
Brooksville, Kentucky

COMMONWEALTH OF KENTUCKY
JAMES C. THOMPSON
24020
LICENSED PROFESSIONAL ENGINEER

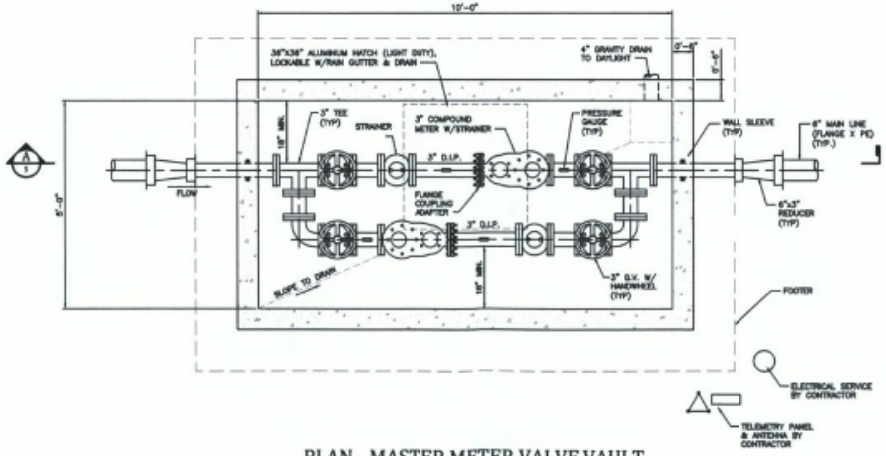
PROJECT NO. 14050

SHEET NO. 1 OF 4



SECTION

SCALE: 3/4"=1'-0"



PLAN - MASTER METER VALVE VAULT

SCALE: 3/4" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL SET VAULT IN PLACE AND CONNECT TO NEW WATER MAIN.
2. ACCESS HATCHES SHALL BE LIGHT DUTY ALUMINUM HINGED LID WITH LOCK.
3. VALVE VAULT SHALL BE A PRECAST CONCRETE VAULT. CONCRETE: 4000 PSI @ 28 DAYS REINFORCED W/#5 BAR @ 6" E.W. TOP OF VAULT TO BE EDGED, BRUSHED AND SEALED WITH CONCEAL. ALL HATCHES 1" ABOVE CONCRETE.
4. ADJUSTABLE PIPE SUPPORT STANCHIONS SHALL BE INSTALLED AT EACH FLANGE AND VALVE. SUPPORTS WILL ALSO BE INSTALLED IN OTHER LOCATIONS AS NECESSARY.
5. METER MUST BE SET IN A HORIZONTAL POSITION AND HAVE AT LEAST 10 DIAMETERS OF STRAIGHT PIPE AT INLET END.
6. STEPS SHALL BE VINYL COATED AND COMPLY WITH O.S.H.A. STD. NO. 1910.27 AND SHALL BE LOCATED TO PERMIT EASY ACCESS FROM VAULT HATCH.
7. 4" DRAIN PIPE TO DITCH LINE IF POSSIBLE. BED DRAIN IN +/- 1 C.Y. OF #57 STONE IF NO STORM DRAIN AVAILABLE. OMIT DRAIN IF WATER TABLE IS ABOVE FLOOR LEVEL.
8. METER MUST BE A "COMPOUND METER" OR APPROVED EQUAL BY THE ENGINEER.

NO.	DATE	REVISIONS	BY

DATE:	SEPTEMBER 2015
PROJECT MGR:	LRS/PBR
DRAWN BY:	CDS
CHECKED BY:	LRS/PBR
SCALE:	AS NOTED

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

Contract No.2
KY 10 INTERCONNECT TO
WESTERN MASON WATER DISTRICT
for the
BRACKEN COUNTY WATER DISTRICT
Brooksville, Kentucky

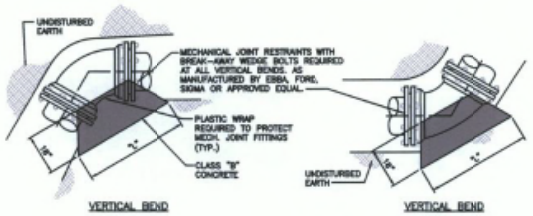
MASTER METER VAULT
PLAN, SECTION and DETAILS

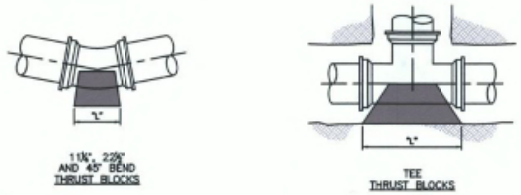
COMMONWEALTH OF KENTUCKY
JAMES C. THOMPSON
24022
PROFESSIONAL ENGINEER

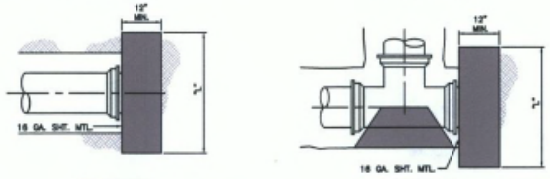
PROJECT NO. 14050

SHEET NO. 2 OF 4

P:\PROJECTS\Brooksville County Water District\14050 - Contract No. 2, KY 10 Interconnect to WMWD\SHEETS\14050-2-SD.dwg 10/01/15







(SEE THRUST BLOCK SCHEDULE FOR DIMENSIONS OF BLOCKING)

THRUST-BLOCKING DETAIL

NOT TO SCALE

THRUST BLOCK SCHEDULE – CLASS 200 PVC

SOIL TYPE – SAND & GRAVEL, BEARING STRENGTH = 3000 PSF

PIPE SIZE	90° BEND					45° BEND					22 ½° BEND					11 ¼° BEND					TEE & DEAD ENDS				
	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L
4"	1.78	0.27	12"	18"	18"	1.00	0.04	12"	12"	12"	0.50	0.03	12"	12"	8"	0.25	0.01	8"	8"	8"	1.50	0.06	12"	18"	12"
6"	4.00	0.13	12"	24"	24"	2.25	0.06	12"	18"	18"	1.13	0.05	12"	18"	12"	0.56	0.01	8"	8"	8"	3.00	0.11	12"	24"	18"
8"	7.00	0.42	18"	36"	30"	4.00	0.33	18"	24"	24"	2.00	0.11	18"	18"	18"	1.00	0.04	12"	12"	12"	5.00	0.28	18"	30"	24"
10"	11.67	0.65	18"	42"	42"	6.53	0.53	18"	30"	30"	3.33	0.18	18"	24"	24"	1.65	0.07	12"	18"	18"	8.75	0.49	18"	42"	30"
12"	16.00	0.89	18"	48"	48"	9.00	0.80	18"	36"	36"	5.00	0.28	18"	30"	24"	2.52	0.09	12"	20"	18"	14.00	0.78	18"	48"	42"
14"	23.80	1.67	24"	48"	54"	13.33	0.97	24"	42"	42"	6.35	0.46	24"	30"	30"	3.33	0.19	18"	24"	20"	17.50	1.20	24"	48"	42"
16"	30.60	2.22	24"	72"	60"	18.00	1.19	24"	48"	48"	8.80	0.67	24"	36"	36"	4.00	0.22	18"	24"	24"	20.00	1.48	24"	60"	48"

THRUST BLOCK SCHEDULE – CLASS 250 PVC

SOIL TYPE – SAND & GRAVEL, BEARING STRENGTH = 3000 PSF

PIPE SIZE	90° BEND					45° BEND					22 ½° BEND					11 ¼° BEND					TEE & DEAD ENDS				
	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L
4"	2.667	.10	12	24	18	1.500	.06	12	18	12	.750	.03	12	12	8	.500	.01	8	12	8	1.667	.06	12	24	18
6"	6.000	.19	12	36	30	3.000	.11	12	24	18	1.500	.06	12	18	12	.750	.01	8	12	8	4.000	.15	12	36	24
8"	9.000	.50	18	36	30	5.000	.39	18	36	30	2.500	.17	18	24	18	1.500	.06	12	18	12	7.000	.39	18	42	24
10"	9.000	.79	18	48	42	7.500	.42	18	36	30	4.167	.33	18	30	30	3.000	.05	12	18	18	10.000	.88	18	42	36
12"	13.327	1.11	18	60	48	12.000	.67	18	48	36	6.000	.33	18	36	24	3.000	.11	12	24	18	14.000	.78	18	48	42
14"	18.130	2.00	24	72	54	15.750	1.17	24	54	42	7.500	.56	24	36	30	4.000	.22	18	24	24	20.000	1.48	24	60	48
16"	23.680	3.48	24	78	66	20.000	1.48	24	60	48	10.500	.78	24	42	36	5.000	.28	18	30	24	27.000	2.00	24	72	54

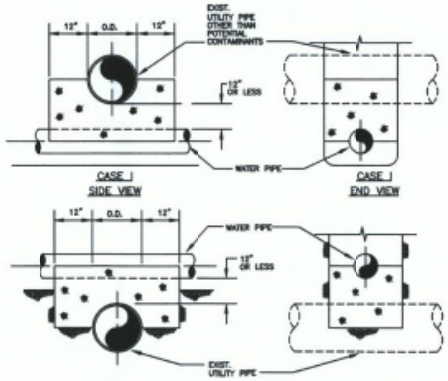
THRUST BLOCK SCHEDULE – CLASS 350 D.I.P.

SOIL TYPE – SAND & GRAVEL, BEARING STRENGTH = 3000 PSF

PIPE SIZE	90° BEND					45° BEND					22 ½° BEND					11 ¼° BEND					TEE & DEAD ENDS				
	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L	THRUST	BEARING	D	W	L
4"	3.750	.21	18	30	18	1.750	.10	18	18	14	1.000	.06	18	12	12	.500	.02	12	12	6	2.250	.13	18	18	18
6"	7.000	.39	18	42	24	3.750	.21	18	30	18	2.000	.11	18	24	12	1.000	.04	12	12	12	5.000	.28	18	30	24
8"	11.250	.91	24	42	42	7.500	.56	24	36	30	4.000	.30	24	24	24	2.000	.11	18	24	12	9.000	.67	24	36	36
10"	20.000	1.48	24	60	48	10.500	.78	24	42	36	6.000	.44	24	36	24	3.000	.17	18	24	18	14.000	1.04	24	48	42
12"	30.000	2.78	30	72	60	15.750	1.48	30	54	42	7.500	.69	30	36	30	4.000	.30	24	24	24	20.000	1.85	30	60	48
14"	36.000	4.33	36	78	72	20.000	2.22	36	60	48	10.500	1.17	36	42	36	6.000	.56	30	36	24	27.500	3.06	36	66	60
16"	46.000	6.35	42	84	84	27.500	3.56	42	66	60	14.000	1.81	42	48	42	7.500	.83	36	36	30	37.750	4.63	42	78	66

THRUST-BLOCKING SCHEDULE

NOT TO SCALE

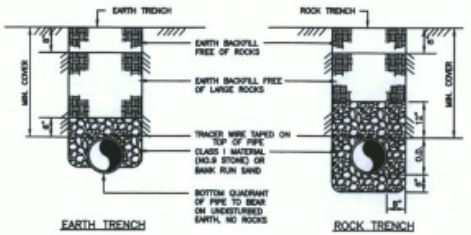


NOTES:

1. CONCRETE SEPARATOR SHALL BE USED WHEN CLEARANCE BETWEEN WATER LINE AND UTILITY PIPE IS 12" OR LESS.
2. "UTILITY PIPE" INCLUDES UNDERGROUND WATER, NATURAL GAS, TELEPHONE, ELECTRICAL CONDUITS, STORM SEWER OR TYPICALLY NON-CONTAMINATING FACILITIES. WHEN CROSSING SANITARY SEWER OR POTENTIAL CONTAMINANTS SEE DETAIL "WATER/SANITARY SEWER CROSSING".

UTILITY CROSSING CONCRETE SEPERATOR

NOT TO SCALE

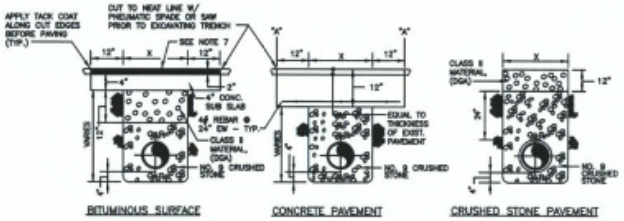


TYPICAL BEDDING and BACKFILL

NOT TO SCALE

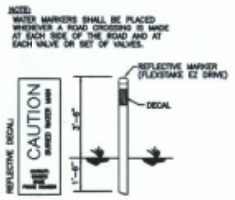
NOTES:

1. REPLACE BITUMINOUS PAVEMENT WITH SAME TYPE AND THICKNESS (2" MIN.) AS EXISTING PAVEMENT.
2. IF ROCK IS ENCOUNTERED, A MINIMUM OF 6" NO. 9 CRUSHED STONE MUST BE PLACED UNDER THE ENCASEMENT PIPE.
3. X = MAX. WIDTH OF TRENCH AT SURFACE UNDER NORMAL CONDITIONS (36" + PIPE O.D.)
4. FROM POINTS "A" TO NEAREST JOINT OR BREAK IN PAVEMENT MUST BE AT LEAST 6' OR MORE. IF LESS THAN 6' REMOVE PAVEMENT TO JOINT OR BREAK AND REPLACE ENTIRE SLAB.
5. NO. 610 CRUSHED STONE MAY BE SUBSTITUTED FOR MECHANICALLY TAMPED EARTH BACKFILL WITH PRIOR APPROVAL OF THE ENGINEER.
6. 1" SAW CUT OUTSIDE OF TRENCH LINES. BITUMINOUS PATCH PLACED IN 2" LIFTS WITH TACK COAT ON EACH SIDE. EACH LIFT COMPACTED WITH SMALL ROLLER.



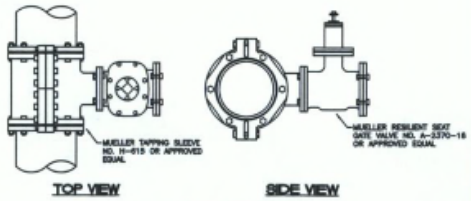
PAVEMENT REPLACEMENT

NOT TO SCALE



WATER MARKER DETAIL

NOT TO SCALE



TYPICAL - WET TAP

NOT TO SCALE

SCALE: 1"=100'

NO.	DATE	REVISIONS	BY

DATE:	SEPTEMBER 2015
PROJECT MGR:	LRS/PBR
DRAWN BY:	CDS
CHECKED BY:	LRS/PBR
SCALE:	AS NOTED

P.O. Box 1934
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

Contract No.2

KY 10 INTERCONNECT TO WESTERN MASON WATER DISTRICT

for the

BRACKEN COUNTY WATER DISTRICT

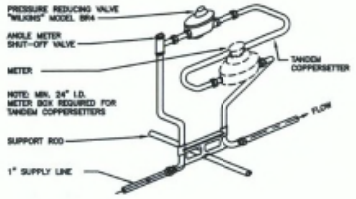
Brooksville, Kentucky

STANDARD DETAILS

COMMONWEALTH OF KENTUCKY JAMES G. THOMPSON 24053 LICENSED PROFESSIONAL ENGINEER

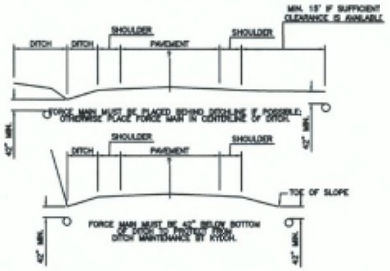
PROJECT NO. 14050

SHEET NO. 3 OF 4



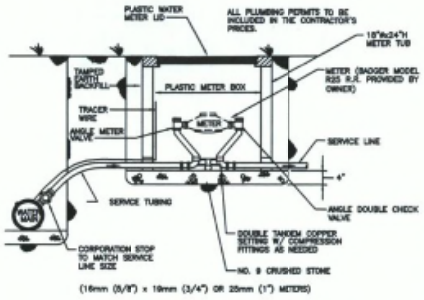
TYPICAL PRESSURE REDUCING VALVE and CUSTOMER METER SERVICE

NOT TO SCALE



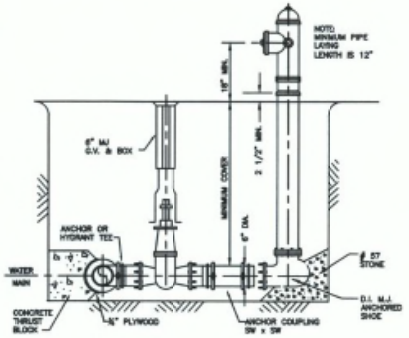
TYPICAL CONSTRUCTION ON KYDOH RIGHT-OF-WAY

NOT TO SCALE



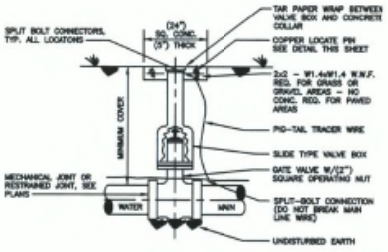
TYPICAL SERVICE CONNECTION

NOT TO SCALE



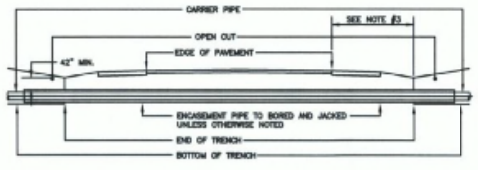
FLUSHING HYDRANT ASSEMBLY

NOT TO SCALE



GATE VALVE INSTALLATION

NOT TO SCALE



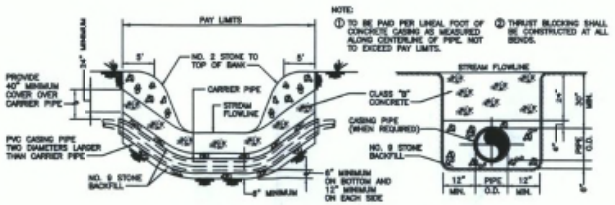
NOTE: SEE DETAIL A FOR PLACEMENT OF CARRIER PIPE IN CASING PIPE.

NOTES:

1. ALL JOINTS SHALL BE SOLIDLY WELDED. END OF CASING SHALL BE SEALED AFTER LINE HAS BEEN INSTALLED AND TESTED.
2. MINIMUM DEPTHS MAY INCREASE IN AREAS WHICH REQUIRE MINIMUM SEPARATION WITH OTHER FACILITIES.
3. OPEN TRENCH NO CLOSER THAN THE DITCHLINE OR TOE OF FILL FROM THE EDGE OF THE PAVEMENT OR AS DIRECTED BY THE SPECIFICATIONS.
4. HIGHWAY CROSSINGS SHALL UTILIZE STEEL CASING PIPE. STEEL CASING PIPES 4" AND LESS SHALL BE NEW SCHEDULE 40. STEEL CASING PIPES LARGER THAN 4" SHALL HAVE MINIMUM WALL THICKNESS OF 0.25". ALL BORED AND JACKED ENCASEMENT PIPE SHALL BE INSTALLED IN BORE HOLES NO LARGER THEN THE OUTSIDE DIAMETER OF THE ENCASEMENT PIPE.

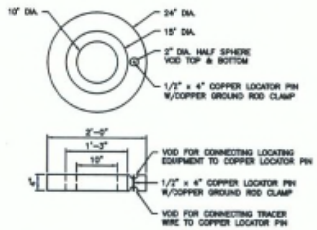
CROSS SECTION OF ENCASED ROAD CROSSING - TYPICAL

NOT TO SCALE



TYPICAL CREEK CROSSING DETAIL

NOT TO SCALE



24" DIAMETER CONCRETE VALVE BOX PROTECTOR RING W/COPPER LOCATOR PIN

NOT TO SCALE

100 0 100 200
SCALE: 1"=100'

NO.	DATE	REVISIONS	BY

DATE:	SEPTEMBER 2015
PROJECT MGR:	LRS/PBR
DRAWN BY:	CDS
CHECKED BY:	LRS/PBR
SCALE:	AS NOTED

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

Contract No.2
KY 10 INTERCONNECT TO WESTERN MASON WATER DISTRICT
for the
BRACKEN COUNTY WATER DISTRICT
Brooksville, Kentucky

STANDARD DETAILS

COMMONWEALTH OF KENTUCKY JAMES C. THOMPSON 24032 LICENSED MECHANICAL ENGINEER

PROJECT NO. 14050

SHEET NO. 4 OF 4

EXHIBIT 8

SPECIFICATIONS

3380SAPE20150002

CONTRACT NO. 2

KY 10 Interconnect to Western Mason Water District

Bracken County Water District

Brooksville, Kentucky

KENTUCKY ENGINEERING GROUP, PLLC

Kentucky Engineering Group, PLLC

P.O. Box 1034

Versailles, Kentucky 40383

September, 2015

KEG Project No. 14050

TABLE OF CONTENTS
BRACKEN COUNTY WATER DISTRICT
CONTRACT 2 - KY 10 INTERCONNECT TO WESTERN MASON WATER DISTRICT

BIDDING REQUIREMENTS, CONTRACT FORMS AND CONDITIONS OF THE CONTRACT

DIVISION 1 - GENERAL REQUIREMENTS

DIVISION 2 - SITE WORK

BIDDING INFORMATION

KENTUCKY ENGINEERING GROUP, PLLC

ADVERTISEMENT FOR BIDS

Sealed bids for "Contract No. 2 - KY 10 Interconnect to Western Mason Water District" for the Bracken County Water District. Brooksville, Kentucky, will be received at 1324 Brooksville Germantown Road, Brooksville, Kentucky, 41004 until 9:30 a.m., Local Time (EST), _____, 2015 and then publicly opened and read aloud.

Contract No. 2 - KY 10 Interconnect to Western Mason Water District. The program of work for which bids are to be submitted consists of approximately 1,800 LF of 6" water main, installation of a new master meter vault, and all related appurtenances as described in the Specifications and Plans. The contract time allotted for the completion of this contract is thirty (30) consecutive calendar days.

The work is located in Bracken County, Kentucky: Drawings, Specifications and Contract Documents may be examined at:

Kentucky Engineering Group, PLLC, Box 1034, Versailles, Kentucky 40383

Bracken County Water District. 1324 Brooksville Germantown Road, Brooksville, Kentucky 41004.

Copies of the Specifications, Plans, and Contract Documents may be obtained from Kentucky Engineering Group, PLLC, Versailles, Kentucky 40383, upon receipt of a non-refundable amount of **$200.00.**

Prevailing Wage Rates Apply

All bids must be made on the required Bid Form and must be fully completed and executed with original signatures and corporate seals.

Hearing impaired individuals may call 1-800-247-2510 for information.

No Bidder may withdraw his Bid within ninety (90) days after the actual date of bid opening.

Bidders on this work will be required to comply with Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, and the Contract Work Hours Standard Act.

Bidders must comply with the President's Executive Orders No. 11246 and No. 11375 and any amendments or supplements to those Executive Orders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed under the contract, Section 3, Segregated Facility, Section 109 and E.O. 11246.

Bidders must certify they do not and will not maintain or provide for their employees any facilities that are segregated or based on race, color, creed, or national origin.

Minorities and small businesses are encouraged to submit bids on this project.

Bracken County Water District reserves the right to waive any bidding informalities and to reject any or all bids, for any reason deemed advisable by the Owner. The right is reserved by the Owner, in the exercise of its sole judgment to reject any or all Bids, and to re-advertise and award the Contract in the regular manner or to waive any informalities, irregularities, mistakes, errors or omissions in any Bid received and to accept any Bid deemed to be responsive to this invitation and favorable to the interests of the Owner.

The sealed bid for this Project shall be clearly marked on the outside of the envelope: Sealed Bid for "Contract 2 - KY 10 Interconnect to Western Mason Water District" for the Bracken County Water District. The bids may be mailed to: Bracken County Water District, 1324 Brooksville Germantown Road, Brooksville, Kentucky 41004. A

INFORMATION FOR BIDDERS

SECTION 2

INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL INSTRUCTIONS AND INFORMATION

1.01 Each Bidder is responsible for inspecting the work site and for being thoroughly familiar with the Contract Documents, including Addenda. The Bidder shall in no way be relieved from any bidding obligation because of unfamiliarity with the site or documents. Neither the Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

1.02 All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply throughout the Contract and they will be deemed to be included in the Contract the same as though herein written out in full.

1.03 The Owner of the Project is Bracken County Water District.

1.04 The Engineer of the Project is Kentucky Engineering Group, PLLC., P.O. Box 1034, Versailles, Kentucky 40383, Phone 859-251-4127, Mr. Jim Thompson, PE.

1.05 The Contract Documents contain the provisions for construction of the Project. Information obtained from an officer, agent, or employee of the Owner, or from any other person, shall not affect the risk or obligation assumed by the Contractor or relieves the Contractor from fulfilling any of the conditions of the Contract.

1.06 The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or an investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work.

PART 2 - SPECIAL INSTRUCTIONS AND INFORMATION

2.01 The Contract will be awarded based on the lowest responsible bid.

PART 3 - BIDDING PROCEDURE

3.01 Bids will be received by the Bracken County Water District until 9:30 A.M. (local time)_____, 2015, and then publicly opened and read aloud at said office.

3.02 Each Bid must be submitted in a sealed envelope, addressed to Bracken County Water District, 1324 Brooksville Germantown Road, Brooksville, Kentucky 41004. The bid may be mailed to: Bracken County Water District, 1324 Brooksville Germantown Road. Brooksville, Kentucky 41004. Each envelope containing a Bid must be plainly marked on the outside as "Sealed Bid for Contract No. 2 - KY 10 Interconnect to Western Mason Water District" for Bracken County Water District and the envelope shall bear on the outside the Bidder's name, address and license number, if applicable, and date and time of opening. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to Bracken County Water District. 1324 Brooksville Germantown Road, Brooksville, Kentucky 41004.

3.03 All Bids must be made on the required bid form. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid form must be fully completed and executed when submitted. Each bid must be submitted on the prescribed form and accompanied by the required certificates. All foregoing certifications must be fully completed and executed when submitted.

Every request for such interpretation should be in writing addressed to Mr. Jim Thompson, P.E. Kentucky Engineering Group PLLC, P.O. Box 1034, Versailles, Kentucky 40383, Phone 859-251-4127, and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if used, will be mailed to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his/her bid as submitted. All addenda so issued shall become part of the contract documents.

3.16 At the time of the opening of bids each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and Contract Documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect of his/her bid.

PART 4 - AWARD OF CONTRACT (AGREEMENT)

4.01 Award of Contract will be made to the lowest responsible Bidder for the Contract unless all Bids are rejected. The Owner reserves the right to reject any and all bids, to waive any bidding informalities, and to disregard all nonconforming, non-responsive or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

4.02 The Bidder to whom the Contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date of the Notice of Award. The Notice of Award will be accompanied by the necessary Agreement and Bond forms. In case of failure of the Bidder to execute the Agreement, the Owner may consider the Bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

4.03 A Performance Bond and a Payment Bond each in the amount of 100 percent (100%) of the Contract Price, with a corporate surety approved by the Owner, will be required for the faithful performance of the Contract. Such Bonds shall not be dated with a date earlier than the date of Agreement for the Contract (Project) being bonded.

4.04 Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their Power of Attorney.

4.05 The Owner within ten (10) calendar days of receipt of acceptable Performance Bond, Payment Bond and Agreement signed by the Bidder to whom the Agreement was awarded, shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may, by written notice, withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

4.06 The Notice to Proceed shall be issued by the Owner within ten (10) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the specified periods or the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

- END OF SECTION -

INFORMATION FOR BIDDERS

SECTION 3

BIDDING PROVISIONS

PART 1 - HOURS AND WAGES

1.01 No laborer, workman or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by this Contract shall be permitted or required to work more than eight hours in any one calendar day or more than five days in any one week except in cases of extraordinary emergency, including fire, flood or danger to life or property.

1.02 Each laborer, workman or mechanic employed by the Contractor, Subcontractor or other person about or upon the work under this contract shall be paid no less than the prevailing rate of wages and shall be provided the supplements not less than the prevailing supplements as determined by the Fiscal Officer pursuant to Article 8 of the Labor Law. The prevailing rate schedule as determined by the Fiscal Officer follows this section and is a part of this Contract. Wage rates redetermined in accordance with the law will be transmitted, when received, to the Contractor and will become a part of this Contract at no cost to the Owner. Any person employed on the site of the work in an occupation not listed in the following prevailing rate schedule shall be paid not less than the minimum rate per hour and shall be provided not less than the supplements designated by the Fiscal Officer.

PART 2. DISCRIMINATION PROHIBITED

The Contractor agrees, in accordance with the applicable provisions of the Labor Law of the State of Kentucky:

2.01 That in the hiring of employees for the performance of work under this Contract or any subcontract hereunder, no Contractor, Subcontractor nor any person acting on behalf of such Contractor or Subcontractor, shall by reason of race, creed, color, national origin, or sex discriminate against any citizen of the State of Kentucky who is qualified and available to perform the work to which the employment relates;

2.02 That no Contractor, Subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, creed, color, national origin, or sex;

2.03 That this Contract may be canceled or terminated by the Owner and all monies due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the Contract;

2.04 The aforesaid provisions of this section covering every contract for or on behalf of the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of Kentucky.

PART 3 - WORKER'S COMPENSATION

3.01 This Contract shall be void and of no effect unless the person or corporation making or performing such contract shall secure compensation for the benefit of, and keep insured during the life of such contract, such employees, in compliance with the provisions of the worker's compensation law.

PART 4 - LIEN LAW

4.01 The attention of the Contractor is invited to the provisions of the Lien Law of the State of Kentucky, wherein funds received by a contractor for a public improvement are declared to constitute trust funds in the hands of such contractor to be applied first to the payment of certain claims.

INSERT FEDERAL WAGE and STATE WAGE RATES HERE

BID AND AGREEMENT FORMS

KENTUCKY ENGINEERING GROUP, PLLC

SECTION 00300

BID FORMS

PART 1 - BIDDER'S PROPOSAL FORM

BIDDER'S PROPOSAL
BRACKEN COUNTY WATER DISTRICT
CONTRACT NO. 2 - KY 10 INTERCONNECT TO WESTERN MASON WATER DISTRCT

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____, doing business as _____ (insert "a corporation", "a partnership", or "an individual" as applicable). Bracken County Water District (hereinafter called "OWNER").

In compliance with the Advertisement for Bids, BIDDER hereby proposes to furnish all equipment, materials and labor for the work required to construct **Contract No. 2 - KY 10 Interconnect to Western Mason Water District– Brooksville, Kentucky** in strict accordance with the Contract Documents, within the time set forth therein, and at the price stated below.

BIDDER declares that no person or persons other than those named herein are interested in this Bid; or in any portion of the profit thereof. By submission of this Bid, the 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.

In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that he has examined the Instructions to bidders, all of the other Bidding Documents and all of the Contract Documents; that he has examined the actual site and locality where the Work is to be performed; that he has familiarized himself with the legal requirements (federal, state and local laws, ordinances, rules and regulations); ;that he has made such independent investigations as he deems necessary; and that he has satisfied himself as to all conditions affecting cost, progress or performance of the Work.

BIDDER further agrees as follows: 1) that this Bid shall remain open and may not be withdrawn for the time period set forth in the Instructions to Bidders; 2) that he accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of his bid security; 3) and that, upon acceptance of this Bid, he will execute the Agreement and will furnish the required Contract security and insurance certificates within the time period(s) set forth in the Instructions to Bidders.

In accordance with the above understanding and agreements and in compliance with the Advertisement for Bids, BIDDER hereby proposes to furnish all equipment, materials and labor for the work required to furnish all equipment, materials and labor for the work required to construct the "Contract No. 2 - KY 10 Interconnect to Western Mason Water District" for Bracken County Water District, in strict accordance with the Contract Documents, within the time set forth therein, and at the price stated below. Also, see Section 01025.

BID SCHEDULE

ITEM NO.	APPROX. QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL BID AMOUNT
1	1,860	LF	**6" PVC Class 200 Water Main** Complete in Place		
2	2	EA	**6" Gate Valve and Box** Complete in Place		
3	40	LF	**Open Cut 14" PVC Casing Pipe (SDR 35)** Complete in Place		
4	3	EA	**Reconnect Existing Meters to New Main** Complete in Place		
5	1	EA	**Flushing Hydrant** Complete in Place		
6	1	EA	**Master Meter Vault and Appurtenances** Complete in Place		

TOTAL AMOUNT BID - (ABOVE ITEMS): _____ Dollars and

_____ (Cents) (_____).

The above prices shall include all labor, materials, overhead, profit, insurance and other costs necessary to cover the finished work of the several kinds called for. The price per foot for pipe installation includes all labor, materials, unclassified excavation, rock blasting and removal, clean-up, etc. for a finished product. Changes in the work shall be processed in accordance with the General Provisions.

By submission of this Bid, the 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.

TIME OF COMPLETION AND LIQUIDATED DAMAGES

The Time of Completion of the construction of this project is highly important to the OWNER. Should any CONTRACTOR neglect, refuse, or fail to complete his Contract within the Time of Completion specified herein, after giving effect to extensions of time is any, herein provided, then in that event and in view of the difficulty of estimating with exactness the full extent of damages to the OWNER caused by delays, the sums stated herein shall be assessed on the CONTRACTOR for each and every day his work is delayed in its completion beyond the specified Time of Completion and the amount of Liquidated Damages, plus such additional engineering and inspection expenses incurred by the Owner.

Contract for the project are stated as follows and as described in the Advertisement for Bids:

DESCRIPTION OF WORK	CALENDAR DAYS **FOR COMPLETION**	LIQUIDATED DAMAGES **PER DAY**
Water Main Construction	30	$750.00

The Contract completion time stipulated above includes an allowance for an average number of inclement weather days as follows:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
Precipitation	7	7	9	8	8	8	8	7	6	5	6	7	87
Freez. Temp.	10	6		1	0						1	5	22
Total	17	13	10	8	8	8	8	7	6	5	7	12	109

When number of days (including Saturdays, Sundays and Holidays) of Precipitation in excess of 0.1" per day or maximum daily temperature of 32 degrees F. exceed those shown above in any month, the CONTRACTOR shall be entitled to that number of additional days for contract completion.

- If, in the ENGINEER'S opinion, sustained bad weather conditions prevent satisfactory performance of the work, he may suspend operations for an executed period until weather conditions are favorable. In this event, contract completion time shall be extended an equal number of days. Upon suspension of

the work by the ENGINEER, the CONTRACTOR shall properly protect his work during the suspension period.

- If the project is not completed within the specified time, the CONTRACTOR'S retainage may be used by the OWNER as one source of funds to compensate the ENGINEER for additional engineering services required because of time delays.

BIDDER hereby agrees to commence work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project within **Thirty (30)** consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of $ 750.00 for each consecutive calendar day thereafter as provided in the General Provisions.

Accompanying this Proposal is a certified check or standard Bid Bond in the sum of _____(Dollars) ($_____) in accordance with the Instructions to Bidders. The BIDDER, by submittal of this Bid, agrees with the OWNER that the amount of the bid security deposited with this Bid fairly and reasonably represents the amount of damages the OWNER will suffer due to the failure of the BIDDER to fulfill his agreements as provided in this Proposal.

BIDDER acknowledges receipt of the following Addenda:

_____

_____

BIDDER agrees that the OWNER reserves the right to delete the whole or any part of the Project from the Contract.

BIDDER understands that the OWNER reserves the right to reject any or all Bids and to waive any informalities in the Bidding.

BIDDER agrees that this Bid shall be good and may not be withdrawn for a period of ninety (60) calendar days after the actual date of bid opening.

BIDDER agrees to perform all of the Work described in the Specifications and shown on the Plans for the amount stated above. Within ten (10) calendar days after receiving written notice of the acceptance of this Bid by the OWNER, the BIDDER will execute and deliver to the OWNER ten (10) copies of the Agreement and such other required Contract Documents.

BIDDER:

_____

By_____

Title_____

Address _____

(Seal - If bid is by a corporation)

_____

Date Signed_____

If BIDDER IS

An Individual

By _____
(Individual's Signature)

Doing business as _____

License or Registration Number: _____

Business Address: _____

_____

_____

Phone No.: _____

A Partnership

By _____
(Firm Name)

Doing business as _____

License or Registration Number: _____

Business Address: _____

Phone No.: _____

- END OF SECTION -

SECTION 00400

SUPPLEMENTS TO BID FORMS

ALL PARTS ARE REQUIRED TO BE COMPLETED AND MUST BE SUBMITTED WITH THE BID. FAILURE TO COMPLETE ALL FORMS MAY BE CAUSE FOR REJECTION OF THE BID.

PART 1 - BIDDER'S QUALIFICATIONS

A. The required names and addresses of all persons interested in the foregoing Bid, as Principals, are as follows:

B. The Bidder shall submit the requested information indicated and for work of a similar character in size and total contract price that is included in the proposed Contract and references to enable the Owner to judge the Bidder's experience, skill and business standing.

1. Number of years in business as a contractor under present business name:

_____

2. Number of years of experience in type of construction required for this project:

_____

3. Have you ever been declared in default or failed to complete work awarded to you? If yes, where and why?_____

_____

4. Have you ever been cited by a regulatory agency for failure to comply with any of its contractual obligations?_____. If yes, where and why?_____

_____

5. List and age of owned equipment available for this project:_____

_____.

6. List similar project experience with references where the Bidder was the prime contractor and percent work completed as prime and percent completed by subcontractors.

Project Name	Description of Work	Date Completed	Contract Amount	% Prime/ % Subcontract	Owner/Contact	Owner Phone No.
1.						
2.						
3.						
4.						
5.						

(Add supplementary pages if necessary)

PART 2 – SUBCONTRACTORS

All proposed subcontractors shall be listed below for each branch of work included in the proposed Contract. All subcontractors are subject to the approval of the Owner. Failure to submit a completed list may be cause for rejection of the Bid. Experience and references of all subcontractors shall be described on separate pages.

BRANCH OF WORK	NAME AND ADDRESS OF SUBCONTRACTOR
_____	
_____	
(Other)	

(Add supplementary pages if necessary)

NOTES:

1. The OWNER in no way implies acceptance of any proposed subcontractor by acceptance of the Bid.
2. The CONTRACTOR will not be allowed to substitute subcontractors not listed herein without prior written approval of OWNER.
3. The CONTRACTOR shall indicate the percent or amount of work proposed by subcontractors for the total project or each branch of work listed.

SUBCONTRACTORS' REFERENCES

List similar project experience with references for each subcontractor proposed and the percent work completed by the subcontractors.

Project Name	Description of Work	Date Completed	Contract Amount	% Prime/ % Subcontract	Owner/Contact	Owner Phone No.
1.						
2.						
3.						
4.						
5.						

(Add supplementary pages if necessary)

PART 3 - MANUFACTURER'S LIST

A. The Bidder proposes to furnish the following equipment contingent upon its conformity to the Specifications and review and acceptance by the ENGINEER and -OWNER.

B. Only one manufacturer's name is to be listed.

NAME OF MANUFACTURER	DESCRIPTION OF MATERIAL
_____	PVC Pipe
_____	Valves
_____	Fittings
Badger Radio Read	Meters
_____	
_____	
_____	_____
_____	

(Add supplementary pages if necessary)

NOTES:
1. OWNER in no way implies acceptance of such listed equipment by acceptance of the Bid.
2. The CONTRACTOR will not be allowed to substitute manufacturers not listed for the units above without prior written approval of OWNER.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____ as Principal, and

_____ as Surety, are hereby held and firmly bound unto

_____ as OWNER in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, 2015. The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for **Contract 2 - KY 10 Interconnect to Western Mason Water District.**

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (Properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(SEAL)

Principal (Legal Signature)

(SEAL)

Surety

By

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and authorized to transact business in the State where the project is located.

DEBARRED FIRMS

The undersigned hereby certifies that the firm of _____ has not and will not award a subcontract, in connection with any contract awarded to it as the result of this bid, to any firm that has been debarred for noncompliance with the Federal Labor Standards, Title VI of the Civil Rights Act of 1964, Executive Order 11246 as amended or any other Federal Law.

Name of Firm Submitting Bid

Signature of Authorized Official

Title

Date

CERTIFIED COPY OF CORPORATE RESOLUTION

(Name of Company)

I hereby certify that I am the duly elected and acting (Insert Title of Officer) _____, a Corporation duly organized and existing under the laws of the State of _____; that on the _____ day of ____, 2015, the Board of Directors of said Corporation authorized and approved a certain Proposal to **Bracken County Water District** for the construction of certain improvements for **Contract No. 2 - KY 10 Interconnect to Western Mason Water District** by said Corporation and any contract resulting there from, and empowered the _____ (Insert Title of Officer) of said Corporation to execute said Proposal and Contract for and in behalf of said Corporation; that said authority is not contrary to any provision in the Articles of Incorporation or code of regulations or code of bylaws of said Corporation; ;that said authority has not been rescinded or modified; and that _____ (Insert Name of Signatory) is the duly elected and acting _____ (Insert Title of Office) of said Corporation.

IN WITNESS WHEREOF, I have hereunto subscribed my name on _____, 2015.

(Signature)

Subscribed and sworn to before me this _____ day of _____, 2015.

(SEAL)

NOTARY PUBLIC

NONCOLLUSION AFFIDAVIT

State of _____)

County of _____)

Bid Identification
Contractor,
being first duly sworn, deposes and says that he is
_____(sole owner, a partner, president, secretary, etc.) of _____, the party making the foregoing bid; that such bid is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that such bid is genuine and not collusive or sham; that said bidder has not directly b or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the bid price of said bidder or of any other bidder, or to fix any overhead, profit, or cost element of such bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract or anyone interested in the proposed contract; that all statements contained in such bid are true; and, further that said bidder has not, directly or indirectly, submitted his bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid and will not pay any fee in connection therewith, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in his general business.

SIGNED

TITLE

Subscribed and sworn to before me this _____ day of _____, 2015.

(SEAL)

NOTARY PUBLIC

- END OF SECTION -

SECTION 00500

AGREEMENT FORMS

PART 1 - NOTICE OF AWARD

TO: _____

_____

_____

PROJECT Description: **Contract No. 2 - KY 10 Interconnect to Western Mason Water District, Bracken County Water District, Brooksville, Kentucky.**

The OWNER has considered the BID submitted by you for the above-described WORK in response to its Bid request.

You are hereby notified that your BID has been accepted for items in the amount of $_____.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, and Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this day of 2015.

BRACKEN COUNTY WATER DISTRICT
OWNER

By_____

Title_____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by this the ____ day of _____, 2015.

By_____

Title Owner_____

PART 2 - AGREEMENT

THIS AGREEMENT, made this the ____ day of _____2015, by and between the **Bracken County Water District.** hereinafter called "OWNER" and _____ doing business as ("a corporation", "a partnership", or "an individual" as applicable), hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. Contractor will commence and complete the construction of Contract 2 - KY 10 Interconnect to the Western Mason Water District for the Bracken County Water District.

2. The following documents shall constitute integral parts of this AGREEMENT, the whole to be collectively known and referred to as the CONTRACT DOCUMENTS and in the case of discrepancies among any parts of the CONTRACT DOCUMENTS, the most stringent shall apply.

3. The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.

4. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within ten (10) calendar days after the date of the NOTICE TO PROCEED and will complete the same within **Thirty (30)** consecutive calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.

5. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of: $_____as shown in the Bid Schedule.

6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. This AGREEMENT shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this AGREEMENT in six (6) copies each of which shall be deemed an original on the date first above written.

BRACKEN COUNTY WATER DISTRICT
OWNER

By_____
(Signature)

Name _____
(Print Name)

Title_____

(SEAL)

ATTEST:

(Signature)

_____
CONTRACTOR

By_____
(Signature)

Name _____
(Print Name)

Address _____

_____

(SEAL)

ATTEST:

(Signature)

Name
(Print Name)

Title

PART 3 - NOTICE TO PROCEED

TO: _____

_____

_____

You are hereby notified to commence WORK in accordance with the AGREEMENT date _____ 2015, on or before _____, 2015, and you are to complete the WORK within **30 consecutive** calendar days thereafter. The date of completion of all WORK is therefore _____, 2015.

BRACKEN COUNTY WATER DISTRICT
OWNER

By _____
(Signature)

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
is hereby acknowledged by:

this the _____ day of _____, 2015

_____
CONTRACTOR

By _____

Title Owner

- END OF SECTION -

SECTION 00600

BONDS AND CERTIFICATES

PART 1 - PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENT: that

_____

(Name of Contractor)

_____

(Address of Contractor)

a _____, hereinafter called PRINCIPAL, and
(Corporation, Partnership or Individual)

_____

(Name of Surety)

_____

(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER.

_____.

_____Dollars ($_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 2015, a copy of which is hereto attached and made a part hereof for the construction of:

PART 1 - PERFORMANCE BOND (Cont'd.)

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof, which may be granted by the OWNER with or without notice to the SURETY and during the one year guaranty period, and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the liability of the PRINCIPAL and SURETY shall be subject to the same limitations and defenses as may be available to them against a claim hereunder by the OWNER.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the AGREEMENT or to WORK to be performed thereunder or the Specifications accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the AGREEMENT not increasing the Contract Price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the AGREEMENT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the AGREEMENT or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiaries hereunder.

PART 1 - PERFORMANCE BOND (Cont'd.)

IN WITNESS WHEREOF, this instrument is executed in __6__ counterparts, each one of which shall be deemed an original, this the ____ day of _____, 2015.

ATTEST: _____
PRINCIPAL

_____
(PRINCIPAL) Secretary

By_____(s)

SEAL:

Address_____

_____

_____
Witness as to PRINCIPAL

Address_____

_____

ATTEST:

_____
SURETY

_____
Witness to SURETY

By_____
Attorney-In-Fact

Address_____

Address_____

_____

_____

NOTE: Date of BOND must not be prior to date of AGREEMENT.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

PART 2 - PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____

(Name of Contractor)

_____

(Address of Contractor)

a _____, hereinafter called PRINCIPAL and
(Corporation, Partnership or Individual)

_____
(Name of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

_____ (Name of Owner)

(Address of Owner)

hereinafter called OWNER.

_____Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain AGREEMENT with the OWNER dated the _____day of _____, 2015, a copy of which is hereto attached and made a part hereof for the construction of:

Contract 2 - KY 10 Interconnect to Western Mason Water District

_____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PART 2 - PAYMENT BOND (Cont'd.)

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL (or with the RUS in the event the RUA is performing the obligations of the OWNER), shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer; (b) After the expiration of eighteen (18) months following the date of which PRINCIPAL ceased work on said Contract, it being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

PART 2 - PAYMENT BOND (Cont'd.)

IN WITNESS WHEREOF, this instrument is executed in 6 counterparts, each one of which shall be deemed an original, this the ____ day of _____, 2015.

ATTEST:

_____
PRINCIPAL

_____
(PRINCIPAL) Secretary

By_____(s)

SEAL:

Address_____

_____

_____
Witness as to PRINCIPAL

Address_____

_____

ATTEST:

_____
SURETY

_____
Witness to SURETY

By_____
Attorney-In-Fact

Address_____

Address_____

_____

_____

NOTE: Date of BOND must not be prior to date of AGREEMENT.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

END OF SECTION

KENTUCKY ENGINEERING GROUP

GENERAL CONDITIONS

KENTUCKY ENGINEERING GROUP, PLLC

SECTION 00700

GENERAL CONDITIONS

1. CONTRACT DOCUMENTS

The Notice to Bidders, Instructions to Bidders, Bid, Bid Bond, Agreement, Performance and Payment Bonds, Certificate of Insurance, Notice of Award, Notice to Proceed, Change Order Form, Contractor's Affidavit to Accompany Partial Payment Estimate, General Conditions, Supplementary General Conditions, Drawings, Addenda and Specifications shall all be binding on the Contractor, and shall be fully a part of the Contract as if thereto attached or therein repeated in words and figures.

2. DEFINITIONS AND MEANINGS OF TERMS

Whenever in the Contract Documents the following terms or pronouns referring to them are used, the intent and meaning shall be interpreted as follows which shall be applicable to both the singular and plural thereof:

A. The CONTRACT shall mean the contract executed by the Owner and the Contractor, of which these General Conditions form a part; the terms CONTRACT and AGREEMENT are synonymous.

B. The terms OWNER and CONTRACTOR shall mean the respective parties to the Contract; the OWNER being a public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed; the CONTRACTOR being the individual, partnership or corporation with whom the Owner has executed the Contract.

C. The term ENGINEER shall mean Kentucky Engineering Group, PLLC., successor, or duly authorized representative.

D. ADDENDA shall mean written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

E. BID shall mean the offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed; the terms BID and PROPOSAL are synonymous.

F. BIDDER shall mean any individual, partnership or corporation submitting a BID for the WORK.

G. BONDS shall mean Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

H. CHANGE ORDER shall mean a written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

I. CONTRACT DOCUMENTS shall mean the contract, including NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, BID, BID BOND, AGREEMENT, PAYMENT BOND, PERFORMANCE BOND, CERTIFICATE OF INSURANCE, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, CONTRACTOR'S AFFIDAVIT TO ACCOMPANY PARTIAL PAYMENT ESTIMATE, DRAWINGS, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, ADDENDA and SPECIFICATIONS.

J. CONTRACT PRICE shall mean the total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

K. CONTRACT TIME shall mean the number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

L. DRAWINGS shall mean the part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

M. FIELD ORDER shall mean a written order effecting a change on the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

N. NOTICE OF AWARD shall mean the written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

O. NOTICE TO PROCEED shall mean written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

P. PROJECT shall mean the undertaking to be performed as provided in the CONTRACT DOCUMENTS.

Q. RESIDENT PROJECT REPRESENTATIVE shall mean the authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

R. SHOP DRAWING shall mean all drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed; the terms SHOP DRAWINGS and SUBMITTALS are synonymous.

S. SPECIFICATIONS shall mean a part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

T. SUBCONTRACTOR shall mean individual, partnership or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

U. SUBSTANTIAL COMPLETION shall mean that date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

V. SUPPLIERS shall mean any person, supplier or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

W. WORK shall mean labor necessary to produce the construction required by the CONTRACT DOCUMENTS, AND all materials and equipment incorporated or to be incorporated in the PROJECT.

X. WRITTEN NOTICE shall mean any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

3. DRAWINGS AND SPECIFICATIONS

The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract

Documents and all incidental work necessary to complete the Project in an acceptable manner, ready for use, occupancy or operation by the Owner.

The Engineer, without charge, will furnish to the Contractor not more than eight (8) sets of the Drawings and Specifications. If additional sets of documents are required by the Contractor for the proper handling of the work, such documents will be furnished to the Contractor at cost.

The Contractor shall keep one set of the Drawings and Specifications on the site of the work. These prints shall be kept and maintained in good condition at the project site and a qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual "as-built" record of the construction progress. Entries and notations shall be made in a neat and legible manner and these prints shall be delivered to the Engineer upon completion of the construction. APPROVAL OF PARTIAL PAYMENTS AND FINAL PAYMENT WILL BE CONTINGENT UPON COMPLIANCE WITH THIS PROVISION.

The Drawings and Specifications are intended to be explanatory to each other, but should any discrepancy appear or any misunderstanding arise as to the importance of anything contained in either, the Engineer shall make the necessary interpretation. Corrections of errors or omissions in the Drawings or Specifications may be made by the Engineer when such corrections are necessary for the proper fulfillment of their intention as construed by the ENGINEER.

All work or materials shown on the Drawings and not mentioned in the Specifications, or any work specified and not shown on the Drawings, shall be furnished, performed, and done by the Contractor as if same were both mentioned in the Specifications and shown on the Drawings.

Should the Contractor in preparing his bid find anything necessary for the construction of the project that is not mentioned in the Specifications or shown on the Drawings, or find any other discrepancy in the Contract Documents, he shall notify the Engineer so that such discrepancies may be corrected by addendum prior to the bid opening. Should the Contractor fail to notify the Engineer of such discrepancies, it will be assumed that his bid included everything necessary for the complete construction in the spirit and intent of the designs shown.

The Contractor may be furnished additional instructions and detail drawings, by the Engineer, as necessary to carry out the Work required by the Contract Documents. The additional drawings and instructions thus supplied will become a part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

4. SHOP DRAWINGS

The Contractor shall submit (in reproducible transparency form unless otherwise specified) shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated especially for the Contract, and materials and equipment for which such drawings are specifically requested.

Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the Contract.

When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted in place of shop and working drawings. In such case, the requirements shall be as specified for shop and working drawings, insofar as possible, except that the submission shall be in quadruplicate.

The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the Work due to the absence of such drawings. Prior to the submittal of any shop drawings, the Contractor shall submit a schedule of proposed shop drawing transmittals. The schedule shall

identify the subject matter of each transmittal, the corresponding specification section number and the proposed date of submission. During the progress of the Work, the schedule shall be revised and resubmitted as necessary.

No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as herein above provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

Until the necessary review has been made, the Contractor shall not proceed with any portion of the Work (such as the construction of foundations), the design or details of work, materials, equipment or other features for which review is required.

All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. All shop and working drawings shall be prepared on standard size, 24-in. by 36-in. sheets, except those which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the Owner, Contractor, and building, equipment, or structure to which the drawing applies, and shall be suitably numbered. Each shipment of drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.

Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer; other drawings shall be returned for correction.

If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in his letter of transmittal.

The review of shop and working drawings hereunder will be general only, and nothing contained in these GENERAL CONDITIONS shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.

Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

The marked-up reproducible of the shop and working drawings or one marked-up copy of catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when so requested. The Engineer will require approximately fifteen (15) days for review of shop drawings.

5. DISCREPANCIES IN DRAWINGS, SPECIFICATIONS AND SHOP DRAWINGS

In case of a discrepancy on the Drawings, figure dimensions shall govern over scale dimensions and large scale drawings shall govern over small scale drawings. In case of a discrepancy in the Specifications and Contract Documents, detailed technical specifications and special or supplementary conditions shall govern over general conditions and other sections of the Contract Documents. In case of a discrepancy between the Drawings and Specifications, the Specifications shall govern; addenda shall govern over all Drawings, Specifications and Contract Documents. Supplementary Conditions shall govern over these General Conditions.

In case of discrepancy between the shop drawings and the requirements of the Drawings, Specifications and Contract Documents, the provisions of the Drawings, Specifications, and Contract Documents shall prevail,

even though the shop drawings have been reviewed by the Engineer, unless the conflict therein has been specifically waived in writing by the Engineer.

Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Engineer, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk.

6. CONTRACTOR

Only one Contractor is recognized as a party to this Contract and where the term CONTRACTOR is used, the prime contractor who signed this Contract is referred to. For convenience, the Specifications may have been divided into separate headings or divisions to cover the various trades represented in the work, and where "Electrical Contractor", "Mechanical Contractor", "Plumbing Contractor" and other such "Contractors" are referred to, it is for convenience only.

It is understood and agreed that the Contractor has satisfied himself as to the nature and location of the work, the topography of the ground, the character and quality of materials to be encountered, the character of equipment or other facilities needed for the proper execution of the Work, the general and local conditions, and all other matters which in any way affect the work under the Contract. No verbal statement of any officer, agent or employee of the Owner or the Engineer, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations contained herein.

7. NOTICE AND SERVICE THEREOF ON CONTRACTOR

The address given in the Proposal upon which this Contract is founded and the Contractor's office at or near the site of the work are hereby designated as places to either of which notices, letters and other communications to the Contractor shall be certified, mailed or delivered. The delivering at the above named places, or depositing in a postpaid wrapper directed to the first named place, in any post office box regularly maintained by the United States Postal Service, of any notice, letter or other communication to the Contractor shall be deemed sufficient service thereof upon the Contractor, and the date of said service shall be the date of delivery or mailing. The first named address may be changed at any time by an instruction in writing, executed and acknowledged by the Contractor and delivered to the Engineer and the Owner. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon the Contractor personally.

8. ASSIGNMENT OF CONTRACT

The Contractor shall not assign, sell, transfer or otherwise dispose of his contract or any monies due or that may become due thereunder, without the prior written consent of the Owner.

9. SUBLETTING CONTRACT

The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under contracting practices, are performed by specialty Subcontractors. However, the Contractor will not be permitted to sublet any portion of his contract to any individual, co-partnership, or corporation without the prior written consent of the Owner and the approval of the Engineer. The Contractor shall not sublet more than fifty percent (50%) of the work without the consent of the Owner and the approval of the Engineer prior to the receipt of bids. The Contractor shall, if requested, notify the Owner in writing of the names of subcontractors proposed for the work.

The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

All subcontractors are subject to the approval of the Owner.

10. COMMENCEMENT AND COMPLETION OF WORK

The Contractor shall commence work on a date to be specified in a written order of the Owner, and shall fully complete all work under the Contract within the number of days set out in the Bid and Contract. As set forth in the Bid and Contract, the work under the Contract will be subject to liquidated damages in the event the work is not completed within the Contract Time.

11. PROSECUTION OF WORK

The Contractor shall give his personal superintendence to the work or shall have a competent superintendent, satisfactory to the Owner and the Engineer on the work at all times during its progress with full authority to act for him. The superintendent shall have been designated in writing by the Contractor as the Contractor's representative at the site. The Contractor may not change or substitute superintendent without written approval of the Owner. All communications given to the superintendent shall be as binding as if given to the Contractor. The Contractor shall also provide an adequate staff for properly coordinating and expediting his work. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

The Contractor shall be prepared to start the work as stipulated in the Proposal, but not until he has received official notice from the Owner to do so. Official notice will be in the form of a written Notice to Proceed. The work shall be prosecuted in a manner and with sufficient materials, equipment, and labor as is considered necessary to insure completion within the time set forth in the Contract. The Contractor shall not suspend the work or any portion of it without the written consent of the Owner and the approval of the Engineer.

12. CONTRACT TIME - DELAYS AND EXTENSIONS

The number of days in which the Contractor shall fully perform the proposed work has been set out in the Proposal and/or Contract. The date of beginning and the time for completion of the Work are essential conditions of the Contract.

In arriving at any credit due the Contractor for an extension of time on the Contract, the Owner, upon the recommendation of the Engineer, may allow such credit as in his judgement is deemed equitable and just for all delays occasioned by any act, or failure to act, on the part of the Contractor or caused by forces beyond the Contractor's control. Additional time will also be allowed the Contractor to cover approved over-runs or additions to the Contract in the same proportion that the said over-runs or additions in monetary value bears to the original contract amount. Delays caused by normal and ordinary weather conditions foreseeable at the time the work is bid will not be the basis for an extension of the Contract Time.

If the Contractor claims that any instructions by Drawings or otherwise involve an extension of time, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.

The Contractor shall make no claim for extra compensation due to delays of the project beyond his control. Such delays may include those caused by any act of neglect on the part of the Owner or Engineer, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the work, or by labor disputes, fire, unusual delays in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or by delay authorized by the Owner pending arbitration, or by any other cause which the Engineer determines may justify the delay.

Time extensions may be granted upon proper justification by the Contractor. Any claim for time extensions under these provisions shall be submitted in writing to the Engineer not more than twenty (20) days following commencement of the delay; otherwise claim will be waived. With submission of claim, Contractor shall provide an estimate of the probable effect of such delay on the progress of the work.

Additional costs incurred in accelerating the work to compensate for such delays (as defined above) shall also not form the basis for extra compensation claims.

13. FAILURE TO COMPLETE WORK ON TIME

Should the Contractor fail or refuse to complete the work within the time specified in his Proposal and/or Contract (or extension of time granted by the Owner), the Contractor shall pay liquidated damages in an amount set out in said Proposal and/or Contract. The amount of liquidated damages shall in no event be considered as a penalty, nor other than an amount agreed upon by the Contractor and the Owner for damages, losses, additional engineering, additional resident inspection and other costs that will be sustained by the Owner, if the Contractor fails to complete the work within the specified time. Liquidated damages will be applied on a rate per day for each and every calendar day (Sundays and holidays included) beyond the contract expiration date stipulated in the Contract Documents, considering all time extensions granted.

14. CHARACTER OF WORKMEN, EQUIPMENT, AND MATERIAL

The Contractor shall employ only workmen skilled in their various duties and shall remove from the project, at the request of the Engineer, any person employed in, about, or upon the work, who misconducts himself or is incompetent or negligent in the performance of the duties assigned to him.

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him. Any careless, untrustworthy, or incompetent workman shall be removed forthwith upon the request of the Engineer or his duly authorized representative. Particular application shall be to workmen who ignore quality specifications on pipe bedding, laying, and backfilling, below grade building, concrete pouring, and other work to be covered up or assuming an unalterable set.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of good quality. The Contractor shall furnish satisfactory evidence as to the kind and quality of materials.

Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

Materials, supplies or equipment to be incorporated into the Work shall not be purchased by the Contractor or any Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

Review of manufacturer's shop drawings of materials and equipment shall not mean final acceptance, but shall be subject to inspection and test on delivery and installation. The Contractor shall repair, replace, or adjust any materials or equipment found defective or not operating properly due to improper materials, workmanship, and adjustment on his part, for a period of one year after completion and acceptance of his work.

15. ENGINEER'S STATUS

In rendering general engineering service, resident engineering and inspection of construction, the Engineer is not in charge of, and shall not be responsible for, the methods of construction, the construction forces or the construction equipment, construction safety procedures, or Contractor payment for labor and materials on the project.

The Engineer will inspect the work as the authorized representative of the Owner and will have authority to stop the work whenever, in his opinion, such action is necessary to insure the proper execution of the Contract. He will also have authority to reject work and materials which do not conform to the Drawings, Specifications and Contract Documents and to direct the place or places where work shall be prosecuted. The Engineer is the agent of the Owner only to the extent provided in the Specifications and Contract Documents, except in special instances when this authority is extended; in such latter instances he will, upon request, show the Contractor written proof of his authority.

The Engineer will also interpret the meaning and requirements of the Drawings, Specifications and Contract Documents, decide all engineering questions, and decide all disputes that may arise between the Owner and the Contractor. The Engineer's decisions on these matters will be final and binding on both the Contractor and the Owner unless the dispute is submitted to arbitration or either party resorts to legal action for settlement.

The Engineer is the interpreter of the conditions of the Contract and the judge of its performance. In this duty, he will not favor either the Owner or the Contractor but will use his authority under the Contract to insure and enforce its faithful performance by both parties.

In case of the termination of the employment of the Engineer, the Owner will appoint a capable and reputable Engineer, whose status under the Contract will be the same as that of the former Engineer; any dispute in connection with such appointment shall be subject to arbitration.

16. ENGINEER'S DECISIONS

The Engineer shall, within a reasonable time after their presentation to him, make decisions on all claims of the Owner or Contractor and on all matters relating to the execution and progress of the work or the interpretations of the Drawings, Specifications and Contract Documents.

Unless otherwise expressly provided in the Specifications and Contract Documents, all the Engineer's decisions are subject to arbitration, provided arbitration is agreed to by both the Owner and the Contractor.

If, however, the Engineer fails to render a decision within ten (10) days after the parties have presented their evidence, either party may then request arbitration. If the Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but shall not disturb or interrupt such proceedings except where such decision is acceptable to the parties concerned.

17. INSPECTION OF WORK

The Engineer, his representatives and representatives of regulatory or sponsoring state or federal agencies shall at all times have full access to the work and to all materials intended for use in the work, as well as to plants where such materials are produced. The Contractor shall provide for such access and inspection. If the work shall be covered up without the knowledge or consent of the Engineer, it must, if directed by the Engineer, be uncovered for examination at the Contractor's expense.

18. INSPECTION OF WORK AWAY FROM THE SITE

If work to be done away from the construction site is to be inspected on behalf of the Owner during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in

writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

19. STANDARD SPECIFICATIONS

Where standard specifications, such as those of the American Society for Testing and Materials, the American National Standards Institute, the American Water Works Association, the American Association of State Highway and Transportation Officials, the Federal Aviation Agency, the Federal Specifications, etc., are referred to in the Specifications and Contract Documents and on the Drawings, said references shall be construed to mean the latest amended and/or revised versions of the said standard or tentative specification.

20. SPECIFIC BRANDS, MAKES OR MANUFACTURERS

Wherever in the Specifications one or more specific brands, makes or manufacturers are set out and qualified by the "or equal" clause, it is intended to denote the quality standard of the article desired, but unless otherwise noted does not restrict the Contractor to the specific brand, make or manufacturer. In cases where one or more specific brands, makes or manufacturers are named and these names are not qualified by the "or equal" clause, it is intended that the Contractor be restricted to one of those named unless otherwise set out.

The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Specifications by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may accept its substitution and use by the Contractor. Any cost differential shall be added or deducted from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutes are accepted, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute shall be made by the Contractor without a change in the Contract Price or Contract Time.

21. "OR EQUAL" CLAUSE

Whenever the words "or approved equal", "or equal", or "similar to", etc., appear in the Specifications, they shall be interpreted to mean an item of material or equipment that, in the opinion of the Engineer, is similar to that named, suited to the same use, capable of performing the same function as that named, has a record of service equal to that named, and is equal in quality, capacity and/or efficiency to that named.

The Engineer's decision as to the equality of any material or equipment to that specified shall be final, but acceptance by the Engineer shall not relieve the Contractor from his responsibility concerning such materials or equipment or affect the guarantee covering the workmanship, materials and equipment.

22. PERMITS AND CODES

Unless otherwise set out in the Specifications or required by the agencies involved, the Contractor shall make application for, obtain and pay for all licenses and permits of a temporary nature necessary for the prosecution of the Work and shall pay for all fees and charges in connection therewith. Permits, licenses and easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the Owner, unless otherwise specified. The Contractor shall be required to comply with all state or municipal ordinances, laws, and/or codes insofar as the same are binding on the Owner.

The intent of this Contract is that the Contractor shall base his bid upon the Drawings and Specifications, but that all work installed shall comply with all applicable codes and regulations as amended by any waivers. Before installing the work, the Contractor shall examine the Drawings and the Specifications for compliance with applicable codes and regulations bearing on the Work, and shall immediately report any discrepancy to the Engineer. Where the requirements of the Drawings and Specifications fail to comply with the applicable code or regulation, the Owner will adjust the Contract by change order to conform to the code or regulation (unless waivers in writing covering the differences have been granted by the governing authority) and shall make appropriate adjustment in the contract price. Should the Contractor fail to observe the foregoing provisions and

install work at variance with any applicable code or regulation as may be amended by waivers (notwithstanding the fact that such installation is in compliance with the Drawings and Specifications), the Contractor shall remove and/or replace such work without cost to the Owner, except that a change order will be issued to cover any additional cost the Contractor would have been entitled to receive if the change had been made before the Contractor commenced work on the items involved.

23. WAGES AND HOURS

The Contractor shall pay not less than the prevailing wage scale set out in these Specifications and Contract Documents, as amended, and shall comply in every respect to applicable rules, regulations and statutes pertaining to wages and hours.

24. NON-REBATE OF WAGES

The Contractor shall comply with the regulations, rulings and interpretations of the Secretary of Labor of the United States, pursuant to the Federal Anti-Kickback Act of June 13, 1934, as amended, 48 Stat. 948; 62 Stat. 74; 63 Stat. 108 (Title 18, U.S.C. Sec. 874 and Title 40 U.S.C. Sec. 276c) including all subsequent amendments which makes it unlawful to induce any person employed in the construction or repair of public buildings or public works to give up any part of the compensation to which he is entitled under his Contract of Employment; and the Contractor agrees to insert a like provision in all subcontracts hereunder. The Contractor may be required to execute an affidavit covering each weekly payroll and certifying compliance with said Anti-Kickback Act.

25. CONTRACT SECURITY OR PERFORMANCE AND PAYMENT BOND

The Contractor will be required to furnish the Owner with a Performance Bond and a Payment Bond to run for one year after the date of final acceptance of the Work by the Owner and the Engineer. The Bonds shall be executed by a surety company duly authorized to do business in the state in which the work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular 570. Each Bond shall be in the amount not less than one hundred percent (100%) of the contract price, as security for the faithful performance of this contract and as security for the payment of all persons performing labor and furnishing materials in connection with this Contract. These Bonds must be executed in the form provided as a part of the Contract Documents, and the surety company shall hold a current certificate of authority, as issued by the Treasury Department, as an acceptable surety on Federal Bonds under an act of Congress approved July 30, 1947. The expense of these Bonds shall be borne by the Contractor.

If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the state in which the Work is to be performed or is removed from the list of Surety Companies acceptable on Federal Bonds, the Contractor shall within five (5) days after notice from the Owner to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such Bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the Owner.

26. SAFETY

The Contractor shall take all necessary precautions and provide all necessary safeguards to prevent personal injury and property damage. The Contractor shall provide protection for all persons including but not limited to his employees and employees of other contractors or subcontractors; members of the public; and employees, agents, and representatives of the Owner, the Engineer, and regulatory agencies that may be on or about the Work. The Contractor shall provide protection for all public and private property including but not limited to structures, pipes, and utilities, above and below ground.

The Contractor shall provide and maintain all necessary safety equipment such as fences, barriers, signs, lights, walkways, guards and fire prevention and fire-fighting equipment and shall take such other action as is required to fulfill his obligations under this subsection.

The Contractor shall comply with all federal, state and local laws, ordinances, rules and regulations and lawful orders of all authorities having jurisdiction for the safety of persons and protection of property.

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971. Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the Contracting Authority may determine to be reasonably necessary.

The Contractor shall also comply with 29 CFR Part 1926 as adopted by 803 KAR 2:400 through 2:425 with amendments, including 29 CFR Part 1910 General Industry Safety and Health Standards applicable to Construction and any supplement to 29 CFR Part 1926 as adopted by Kentucky Occupational Safety and Health Program, Kentucky Labor Cabinet.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This responsible person shall have the authority to take immediate action to correct unsafe or hazardous conditions and to enforce safety precautions and programs.

There shall be absolutely no alcoholic beverages or drugs on the site any time.

27. INSURANCE, CONTRACTOR'S COVERAGE AND CANCELLATION PROVISION

The Contractor will not be permitted to commence work until he has obtained all insurance required by these documents and such insurance has been approved by the Engineer and/or Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all insurance required has been so obtained and approved. Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work.

Such insurance shall be secured from an insurance company authorized to write casualty insurance in the state where the Work is located and shall protect the Contractor, his subcontractors, and the Owner from claims of bodily injury, death, property damage, fire and other risks set out herein.

Each policy of insurance covering the Contractor's operations under the Contract shall provide either in the body of the policy, or by appropriate endorsement (rider) to the policy, that such policy cannot be altered or cancelled in less than fifteen (15) days after the mailing of written notice of such alteration or cancellation to the Owner (insured) and the Engineer or not less than ten (10) days after actual receipt by the Owner (insured) and the Engineer, of written notice of such pending alteration or cancellation.

Certificates of Insurance coverage shall include a statement of alteration or cancellation provisions of the policy, sufficient to show definitely that such provisions comply with the requirements stated herein.

28. INSURANCE, WORKMEN'S COMPENSATION

The Contractor shall take out and maintain during the life of this Contract, Workmen's Compensation Insurance, as required by statute, for all of his employees employed at the site of the Project, and in case any work is sublet, for all the subcontractor's employees not otherwise insured. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the Workmen's Compensation Statute, the Contractor shall provide adequate coverage for the protection of the employees not otherwise protected.

29. INSURANCE, PUBLIC LIABILITY

The Contractor shall take out and maintain during the life of this Contract such Public Liability (Bodily Injury and Property Damage) Insurance as shall protect him and any subcontractor performing work covered by this Contract from claims for damages because of bodily injury, including accidental death and from claims for property damages, which may arise from operations under this Contract, whether such operations be by him or by any subcontractor, or by anyone directly or indirectly employed by either of them.

Liability coverage is to be written on a comprehensive general liability policy and must include: (a) premises-operations, manufacturers and contractors, and owners, landlords and tenants; (b) contractors protective; (c) products-completed operations; (d) contractual liability per Paragraph 34 of the General Conditions. General liability shall also include "underground property damage by mechanical equipment" and when blasting is done coverage must be provided for the explosion hazard.

Where work on railroad rights-of-way is involved, the Contractor shall also be covered by Railroad Protective Liability Insurance with limits of liability as required by the railroad company on whose property the work is being performed.

30. INSURANCE, BUILDERS RISK

The Contractor shall provide Builders Risk Insurance (fire and extended coverage) on all work in place and/or materials stored at the site. Such insurance shall provide coverage as set forth in Paragraph 31 hereinafter. The policy shall name as the insured the Contractor, the Engineer and the Owner.

31. MINIMUM INSURANCE LIMITS

The minimum amounts of insurance to be furnished by and for the general contractor and the subcontractors under this Contract are:

a. Workmen's Compensation - Applicable State Statutes
Employers Liability - $1,000,000 limit of liability

b. Comprehensive General Liability:

Coverage A - Bodily Injury Liability -
$2,000,000 each occurrence
$2,000,000 aggregate
Coverage B - Property Damage Liability -
$1,000,000 each occurrence
$1,000,000 aggregate

c. Comprehensive Automobile Liability:

Coverage A - Bodily Injury Liability -
$1,000,000 each person
$1,000,000 each occurrence
Coverage B - Property Damage Liability -
$1,000,000 each occurrence

d. Umbrella Excess Liability.....$2,000,000

e. Builders Risk Insurance - To include coverage for not less than the losses due to Fire, Explosion, Hail, Lightning, Vandalism, Malicious Mischief, Wind, Collapse, Riot, Aircraft, Smoke, Transportation and Extended Coverage for benefit of the Owner, Engineer, Contractor, and subcontractors as their interests may appear during the Contract Time and until the Work is accepted by the Owner.

100% of Insurable Value of Materials and Accessories to be used in conjunction with the Project.

f. Railroad Protection Insurance - (where work to be within railroad right-of-way)

Loss of Life or Injury to Person - As required by Railroad
Property Damage - As required by Railroad

32. INSURANCE, PROOF OF CARRIAGE

The Contractor shall furnish the Owner and the Engineer with satisfactory proof of carriage of the insurance required by submitting completed Insurance Certificates.

33. *ROYALTIES AND PATENT FEES*

The Contractor shall pay license fees and royalties and assume all costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. As set forth in Paragraph 34, hereinafter, he shall indemnify and hold harmless the Owner and all of its officers, agents and employees from and against all claims, damages, losses and expenses (including attorneys' fees) arising out of any infringement of such rights during or after completion of the work, and shall defend all such claims in connection with any alleged infringement of such rights.

34. RESPONSIBILITY FOR DAMAGE, CLAIMS, ETC.

The Contractor shall indemnify and save harmless the Owner, the Engineer and subconsultants and all of their officers, agents and employees, from all claims, damages, losses and expenses including attorneys' fees of any character, name and description brought for, or on account of any injuries or damages received or sustained by any person, persons, or property by or from the said Contractor or by or in consequence of any neglect in safeguarding the work or through the use of unacceptable materials used on construction or by or on account of any act or omission, neglect, or misconduct of the said Contractor or by or on account of any claims or amounts recovered from any infringement of patent, trademark or copyright, or from any claims or amounts arising or recovered under any law, ordinance, order, or decree, and so much of the money due the said Contractor under and by virtue of his contract as shall be considered necessary by the Owner may be retained for the use of the Owner, or in case no money is due, his surety shall be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid, shall have been settled and suitable evidence to that effect furnished to the Owner.

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

35. *HANDLING AND DISTRIBUTION*

The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the Work; and shall be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the Work.

Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

36. MATERIALS - SAMPLES - INSPECTION

Unless otherwise expressly provided on the Drawings or in any of the other Contract Documents, only new materials and equipment shall be incorporated in the Work. All materials and equipment furnished by the Contractor to be incorporated in the Work shall be subject to the inspection of the Engineer. No material shall be processed or fabricated for the Work or delivered to the Work site without prior concurrence of the Engineer.

As soon as possible after execution of the Agreement, the Contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment he proposes to incorporate into the Work. When shop and working drawings are required as specified below, the Contractor shall submit prior to the submission of such drawings, data in sufficient detail to enable the Engineer to determine whether the manufacturer and/or the supplier have the ability to furnish a product meeting the Specifications. The Contractor shall also submit data relating to the materials and equipment he proposes to incorporate into the Work in sufficient detail to enable the Engineer to identify and evaluate the particular product and to determine whether it conforms to the Contract requirements. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.

Facilities and labor for the storage, handling, and inspection of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the Work.

If the Engineer so requires, either prior to or after commencement of the Work, the Contractor shall submit samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the Specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed, and shipped by the Contractor as directed. The Contractor shall furnish suitable molds for making concrete test cylinders.

All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or work and location for which the material is intended, and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.

The Contractor shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection and testing before the materials and equipment are needed for incorporation in the Work. The consequences of his failure to do so shall be the Contractor's sole responsibility.

In order to demonstrate the proficiency of workmen, or to facilitate the choice among several textures, types, finishes, surfaces, etc., the Contractor shall provide such samples of workmanship of wall, floor, finish, etc., as may be required.

When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, equipment performance ratings, and concrete data.

After review of the samples, data, etc., the materials and equipment used on the Work shall in all respects conform therewith.

37. PAYMENT FOR MATERIALS STORED AT SITE OF PROJECT

Payment for materials or equipment purchased and stored at the site of the Project will be allowed by the Owner at the cost of such materials or equipment, less the same percentage of retainage applicable to payment for completed work, upon specific recommendation of the Engineer. Such payment shall be conditional upon submission by the Contractor of bills of sale or such other procedure as will establish the Owner's title to such material or otherwise adequately protect the Owner's interest.

Only durable materials and equipment which in the opinion of the Engineer have been properly stored and protected shall be included in materials furnished in partial payment estimates. Clay pipe, brick and tile will be excluded. In the interest of simplification of checking and bookkeeping, miscellaneous supplies will also be excluded.

38. MATERIALS

A. Materials, Domestic and Foreign Manufacture: Unless otherwise specified, only such unmanufactured articles, materials and supplies as have been mined or produced in the United States of America, and only such manufactured articles, materials and supplies as have been manufactured in the United States of America substantially all from articles, materials, or supplies mined, produced, or manufactured -- as the case may be -- in the United States of America, shall be employed under this Contract in the construction of the Project.

B. Materials, Convict Manufacture: No materials manufactured or produced in a penal or correctional institution shall be incorporated in the Work under this Contract.

39. DEFECTIVE MATERIALS AND WORKMANSHIP

Materials brought to the site which are not in accordance with the Specifications shall be removed from the site of the Work by the Contractor at his own expense. Such material shall be so disposed of that there will be no probability of their being used on the work or in the construction.

Upon notice from the Engineer, all defective workmanship shall be immediately remedied by the Contractor, at his own expense.

If the Contractor fails to remove defective materials or to correct defective workmanship within a reasonable time, fixed in the notice from the Engineer, the Owner may remove the defective materials and/or correct the defective work and charge all the expense in connection therewith to the Contractor.

40. GUARANTY

The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. Repairs made during the warranty period shall be guaranteed for one (1) year. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other Work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

41. FIELD OFFICE

Each Contractor shall establish and maintain a field office on his project and have available at the office a responsible representative who can officially receive instructions from the Engineer. The Contractor shall have one complete, up-to-date set of Drawings, Specifications and Addenda in this office at all times.

Each office shall contain facilities for a Resident Project Representative, including a desk or table, chair and filing cabinet for his use.

Each office shall be provided with telephone service, facsimile machine, toilet facilities, light and heat; the cost of which shall be borne by the Contractor.

42. SANITARY FACILITIES

The Contractor shall provide adequate sanitary facilities for the use of those employed on the Work. Such facilities shall be made available when the first employees arrive on the site of the Work, shall be properly secluded from public observation, and shall be constructed and maintained during the progress of the Work in suitable numbers and at such points and in such manner as may be required.

The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the Owner, or on adjacent property.

43. EMPLOYMENT QUALIFICATIONS

No person under the age of eighteen (18) years and no convict labor shall be employed to perform any work under this Contract. No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health or safety of others shall be employed to perform any work under this Contract, provided that this shall not operate against the employment of physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform. There shall be no discrimination because of race, creed, color, sex or political affiliation in the employment of persons for work under this Contract.

44. EMPLOYMENT SERVICES AND LABOR PREFERENCES

With respect to additional skilled, semi-skilled and unskilled workers employed to perform work on the Project, preference in employment shall be given first to persons who reside in the city in which the Work is to be performed, and second to persons residing in the county in which the Work is to be performed.

45. PAYMENT OF EMPLOYEES

The Contractor and each of his subcontractors shall pay each of his employees engaged in work on the Project in full (less deductions made mandatory by law) in cash or by check once each week.

46. SCHEDULES, REPORTS AND RECORDS

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning Work performed or to be performed.

When required, the Contractor shall furnish the Owner with proof that all payrolls for services rendered and invoices for materials or equipment supplied have been duly paid. The Contractor shall provide all such other data as the Engineer and/or Owner may required.

In connection with all lump sum contracts or lump sum portions of unit price contracts, the Contractor shall furnish the Engineer a detailed breakdown on which to base partial payment estimates. The detailed breakdown shall be subject to review by the Engineer.

The Contractor shall furnish and keep current a progress chart or schedule showing the estimated and actual progress of the Work. The progress chart or schedule shall be subject to review by the Engineer.

The Contractor shall furnish all the necessary information for and assist in the preparation of, and/or prepare the partial payment estimates on forms furnished by the Engineer.

Record drawings and specifications shall be reviewed by the Engineer prior to submittal of partial payment estimates. Approval of partial or final payments will be contingent upon compliance with this provision.

47. PLANNING AND PROGRESS SCHEDULES

Before starting the Work and from time to time during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written description of the methods he plans to use in doing the Work and the various steps he intends to take. Within fifteen (15) days after the date of formal execution of the Agreement, the Contractor shall prepare and submit to the Engineer: (a) a written schedule fixing the dates on which additional drawings, if any, will be needed by the Contractor; and (b) a written schedule fixing the respective dates for the start and completion of various parts of the Work. Each such schedule shall be subject to review from time to time during the progress of the Work.

The Contractor shall also submit a schedule of payments that he anticipates he will earn during the course of the Work.

The Owner, or his authorized representatives and agents, shall be permitted to inspect all payroll, records of personnel, invoices for materials or equipment and other relevant data and records.

48. PAYMENTS BY CONTRACTOR

The Contractor shall pay: (a) for all transportation and utility services not later than the 20th day of the calendar month following the month in which such services are rendered; (b) for all materials, tools and other expendable equipment to the extent of ninety percent (90%) of the cost thereof, not later than the 20th day of the calendar month following the month in which such materials, tools and equipment are delivered at the site of the Project, and the balance of the cost thereof not later than the 30th day following completion of that part of the Work in or on which such materials, tools and equipment are incorporated or used; and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein.

49. FUNDS FOR PARTIAL PAYMENT ESTIMATES

Funds for partial payment estimates have been provided by the Owner so that they may be paid in cash as set out herein. The Contractor must understand, however, that in handling the financing of such work, delays beyond the control of the Owner are liable to occur in meeting the partial payments, and a reasonable delay on the part of the Owner in making payment to the Contractor for any period shall not be construed as a breach of contract on the part of the Owner.

50. PARTIAL PAYMENT ESTIMATES

On or about the 15th of each calendar month, the Owner will make partial payment to the Contractor on the basis of a duly certified approved estimate of the Work performed during the preceding calendar month by the Contractor, but the Owner will retain not more than ten percent (10%) of the amount of each estimate until final completion and acceptance of all Work covered by this Contract, subject to possible modification as set out hereinafter.

The partial payment estimate shall be completed and signed by the Contractor and shall be supported by such data as the Engineer may reasonably require. The Contractor shall delineate on each partial payment estimate for each item in the bid form, the amounts associated with bond costs, overhead, insurance, labor and materials. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Owner, as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten days after receipt of each partial payment estimate, either indicate in writing his approval of payment or present the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate.

The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

All Work covered by partial payment made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work upon which payments have been made or the restoration of any damaged Work, or as a waiver of the right of the Owner to require the fulfillment of all terms of the Contract Documents.

Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted by him under the conditions of the Contract Documents. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Owner, shall be paid to the Contractor in approximately sixty (60) days of completion and acceptance of the Work.

The Contractor will indemnify and save the Owner and the Owner's agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

If the Owner fails to make payment in approximately sixty (60) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest at prime rate plus two (2) percentage points commencing on the first day after said payment is due and continuing until the payment is received by the Contractor.

51. OWNER'S RIGHT TO WITHHOLD PAYMENTS

In order to protect the Owner from loss, payment may be withheld which would otherwise be due the Contractor on account of:

A. Defective work not remedied or defective materials not removed from site.

B. Claims filed, or reasonable evidence indicating imminent filing of claims, against the Contractor.

C. Failure of the Contractor to make payments properly to subcontractors or for material or labor.

D. A reasonable doubt that the Contract can be completed for the balance then unpaid.

E. Damage to another Contractor.

F. Performance of work in violation of the terms of the Contract.

G. Expiration of Contract Time.

Should the Owner withhold payment for any of the above reasons, the Owner will provide written notice to the Contractor giving reason for withholding payment.

52. DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer and Owner deem it inexpedient to correct work damaged or not done in accordance with the Contract, a deduction from the Contract price may be negotiated.

53. PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. He shall notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor of anyone directly and indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the Contract Documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them maybe liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor with special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He shall give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

54. WORK ON "PRIVATE PROPERTY"

Private property is defined as property other than that belonging to the Owner. Highway and railroad rights-of-way, public parks, school yards and other such properties shall be considered "private properties" for the purpose of this Paragraph.

In connection with water line, sewer line, gas line or similar work performed on "private property", the Contractor shall confine his equipment, the storage of materials and the operations of his workmen to the limits indicated on the Drawings, or to lands and rights-of-way provided for the Project by the Owner, and shall take every precaution to avoid damage to the buildings, grounds and facilities of the owners' of private property.

Fences, walls, hedges, shrubs, etc., shall be carefully removed, preserved, and replaced when the construction is completed. Grassed areas, other than lawns, shall be graded, fertilized and seeded when construction is completed and in accordance with the requirements of the technical Specifications. Where ditches or excavations cross lawns, the sod shall be removed carefully and replaced when the backfilling has been completed. If sod is damaged or not handled properly, it shall be replaced with new sod equal to existing sod at the Contractor's expense. When construction is completed, the facilities and grounds of the private property owners shall be restored to as good or better condition than found as quickly as possible at the Contractor's expense.

When directed by the Engineer, large trees or other facilities that cannot be preserved and replaced shall be removed by the Contractor. The Owner will assume the responsibility for settling with the property owner for the loss of said trees or facilities. The Contractor shall be solely and entirely responsible for any damage to all other trees or facilities.

Foundations, adjacent to where an excavation is to be made below the bottom of the foundation, shall be supported by shoring, bracing or underpinning as long as the excavation shall remain open, or thereafter if required to insure the stability of the foundation and the Contractor shall be held strictly responsible for any damage to said foundations.

55. LANDS FOR WORK

The Owner will provide the lands upon which the work under this Contract is to be done or the necessary easements over said lands to include sufficient space for the proper execution of the work, together with right of access to same. The Owner will provide the Contractor information which delineates and describes the lands owned and rights-of-way acquired. The Contractor shall, at his own expense and without liability to the Owner, provide land required for storage of his construction materials and for any temporary construction facilities for the storage of his equipment. The Contractor will construct at his own expense, any temporary roads or bridges necessary for his own use; he will also furnish his own power and water supply unless otherwise specifically set out herein.

56. INTERFERENCE WITH AND PROTECTION OF STREETS

The Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefor from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the proper authorities.

Streets, roads, private ways, and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefor.

The Contractor shall, at least 24 hours in advance, notify the Police and Fire Departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.

All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

57. EXISTING UTILITIES

Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

The available information concerning the location of existing underground utilities is shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies or departments that own and operate utilities in the vicinity of the Construction Work. The purpose of the conference, or conferences, shall be to notify said companies, agencies or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies, or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost for locating and avoiding, or repairing, damage to said existing utilities.

The Contractor shall locate all unknown metallic hazards, namely buried pipe, metals, etc., by using a pipe locator. The pipe locator shall immediately precede the trench ditching and all hazards located shall be marked in such manner as to notify the machine operator of such hazard.

Where existing utilities or appurtenant structures, either underground or above-ground, are encountered, they shall not be displaced or molested unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Relocation and/or replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense, unless such relocation and/or replacement is by statute or agreement the responsibility of the owner of the utility.

58. ARBITRATION

A. Request for Arbitration

Any decision of the Engineer which is subject to arbitration may be submitted to arbitration only upon agreement of both parties to the dispute.

The Contractor shall not cause a delay of the Work because of pending arbitration proceedings, except with the written permission of the Engineer, and then only until the arbitrators shall have had an opportunity to determine whether or not the Work shall continue until they decide the matters in dispute.

The request for arbitration shall be delivered in writing to the Engineer and the adverse party, either personally or by registered mail to the last known address of each, within ten (10) days of the receipt of the Engineer's decision, and in no case after final payment has been accepted except as otherwise expressly stipulated in the Contract Documents. If the Engineer fails to make a decision within a reasonable time, a request for arbitration may be made as if his decision has been rendered against a requesting party.

B. Arbitrator

No one shall be nominated or act as an arbitrator who is in any way financially interested in this Contract or in the business affairs of the Owner, or the Contractor, or the Engineer or otherwise connected with any of them. Each arbitrator shall be a person in general familiar with the work or the problem involved in the dispute submitted to arbitration, preferably a recognized Engineer, experienced in the type of construction in question.

Unless otherwise provided by controlling statutes, the parties may agree upon one arbitrator; otherwise there shall be three, one named in writing by each party to this Contract, and a third chosen by these two arbitrators, or, if they should fail to select a third within fifteen (15) days, then he shall be appointed by the presiding officer, if a disinterested party, of the Bar Association nearest to the location of the Work. Should the party requesting arbitration fail to name an arbitrator within ten (10) days and upon his failure to do so then such arbitrator shall be appointed, on the petition of the party requesting arbitration, by a judge of the Federal Court in the District where such arbitration is to be held.

The said presiding officer shall have the power to declare the position of any arbitrator vacant by reason of refusal or inability to act, sickness, death, resignation, absence or neglect. Any vacancy shall be filled by the party making the original appointment, and unless so filled within five (5) days after the same has been declared vacant, it shall be filled by the said presiding officer. If testimony has been taken before a vacancy has been filled by the presiding officer, the matter must be reheard unless a rehearing is waived in the submission or by the written consent of the parties. If there be one arbitrator, his decision shall be binding; if three, the decision of any two shall be binding in respect to both the matters submitted and the procedure followed during the arbitration.

C. Arbitration Procedure

The arbitrators shall deliver a written notice to each of the parties and to the Engineer, either personally or by registered mail to the last known address of each, of the time and place for the beginning of the hearing of the matters submitted to them. Each party may submit to the arbitrators such evidence and argument as he may desire and the arbitrators may consider pertinent. The arbitrators shall, however, be the judge of all matters of law and fact relating to both the subject matter of and the procedure during arbitration and shall not be bound by technical rules of law or procedure. They may hear evidence in whatever form they desire. The parties may be represented before them by such person or persons as each may select, subject to the disciplinary power of the arbitrators if such representative shall not interfere with the orderly or speedy conduct of the proceedings.

Each party and the Engineer shall supply the arbitrators with such papers and information as they may request, or with any witness whose movements are subject to the respective control, and upon refusal to comply with such requests, the arbitrators may render their decision without the evidence which might have been elicited therefrom and the absence of such evidence shall afford no ground for challenge of the award by the party refusing or neglecting to comply with such demand.

The submission to arbitrators (the statement of the matters in dispute between the parties to be passed upon by the arbitrators) shall be in writing duly acknowledged before a notary. Unless waived in writing by both parties to the arbitration, the arbitrators, before hearing testimony, shall be sworn by an officer authorized by law to administer an oath, to faithfully and fairly hear and examine the matters in controversy and to make a just award according to the best of their understanding.

The arbitrators, if they deem the case demands it, are authorized to award to the party whose contention is sustained such sums as they shall consider proper for the time, expense and trouble incident to the arbitration, and if the arbitration was requested without reasonable cause, damages for delay and other losses. The arbitrators shall fix their own compensation, unless otherwise provided by agreement, and shall assess the costs and charges of the arbitration upon either or both parties.

The award of the arbitrators shall be in writing and acknowledged like a deed to be recorded, and a duplicate shall be delivered personally or by registered mail, forthwith upon its rendition, to each of the parties to the controversy and to the Engineer. Judgment may be rendered upon the award by the Federal Court or the highest State Court having jurisdiction to render same.

The award of the arbitrators shall not be open to objection on account of the form of proceedings or the award, unless otherwise provided by controlling statutes. In the event such statutes provide otherwise on any matter covered by this Article than hereinbefore specified, the method procedure throughout and the legal effect of the award shall be wholly in accord with said statutes, it being the intention hereby to lay down a principle of action to be followed, leaving its local application to be adapted to the legal requirements of the jurisdiction having authority over the arbitration.

The Engineer shall not be deemed a party to the dispute. He is given the right to appear before the arbitrators to explain the basis of his decision and give such evidence as they may require.

59. ALTERATION IN DRAWINGS AND SPECIFICATIONS

The Owner reserves the right to make such alteration in the Drawings and Specifications or in the character of the Work as may be considered by the Engineer necessary or desirable from time to time to complete the Project in an acceptable manner; provided that, if alterations are made, the general character of the Work as a whole is not changed thereby.

Such alterations shall not be considered as a waiver of any condition of the Contract nor to invalidate any of the provisions nor to release the bond thereof.

60. CHANGES IN THE WORK

The Owner may make changes in the work of the Contractor by making alterations therein, or by making additions thereto, or by omitting work there from, without invalidating the Contract, and without relieving or releasing the Contractor from any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such changes shall be in the form of a Change Order issued by the Engineer, and executed by the Owner and Contractor, under the conditions of the original Contract.

Except in an emergency endangering life or property, no change shall be made by the Contractor unless in pursuance of a written Change Order. No claim for an adjustment of the Contract Price or Time shall be valid unless so ordered.

The Engineer, also, may at any time, by issuing a field order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer unless the Contractor believes that such field order entitles him to a change in Contract Price or Time, or both, in which event he shall give the Engineer written notice thereof within fifteen (15) days after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

Should the Contractor encounter or discover during the progress of the Work subsurface or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, the attention of the Engineer shall immediately be called to such conditions before they are disturbed. If the Engineer finds that they so materially differ, he will at once make such changes in the Drawings or Specifications as he may find necessary. Any adjustment in the Contract Price or Time as may be justifiable shall be made by means of a written Change Order and must be negotiated with the owner, engineer and DOW/KIA as provided herein.

61. CLAIMS FOR EXTRA WORK

If the Contractor claims that any instructions by Drawings or otherwise involve extra cost, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the Work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.

Claims for additional compensation for extra work, due to alleged errors in spot elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work than would reasonably be estimated from the Drawings and topographical maps issued.

Any discrepancies which may be discovered between actual conditions and those represented by the topographical maps and Drawings shall at once be reported to the Engineer, and Work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Engineer.

If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract Price or Time is justifiable, the procedure shall then be as provided herein for "Changes in the Work".

By execution of this Contract, the Contractor warrants that he has visited the site of the proposed work and fully acquainted himself with the conditions there existing relating to construction and labor, and that he fully understands the facilities, difficulties, and restrictions attending the execution of the work under this Contract. The Contractor further warrants that he has thoroughly examined and is familiar with the Drawings, Specifications and all other documents comprising the Contract. The Contractor further warrants that by execution of this Contract his failure when he was bidding on this Contract to receive or examine any form, instrument or document, or to visit the site and acquaint himself with conditions there existing, in no way relieves him from any obligation under the Contract, and the Contractor agrees that the Owner shall be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.

62. DETERMINATION OF THE VALUE OF EXTRA (ADDITIONAL) OR OMITTED WORK

The value of extra (additional) or omitted work shall be determined in one or more of the following ways:

A. On the basis of the actual cost of all the items of labor (including on-the-job supervision), materials, and use of equipment, plus 15 percent which shall cover the Contractor's general supervision, overhead and profit. In case of subcontracts, the 15 percent is interpreted to mean the subcontractor's supervision, overhead and profit, and an additional 5 percent may then be added to such costs to cover the General Contractor's supervision, overhead and profit. The cost of labor shall include required insurance, taxes and fringe benefits. Equipment costs shall be based on current rental rates in the areas where the work is being performed but, in no case shall such costs be greater than the current rates published by the Associated Equipment Distributors, Chicago, Illinois.

B. By estimate and acceptance in a lump sum.

C. By unit prices named in the Contract or subsequently agreed upon.

Provided, however, that the cost or estimated cost of all extra (additional) work shall be determined in advance of authorization by the Engineer and approved by the Owner.

All extra (additional) work shall be executed under the conditions of the original Contract. Any claim for extension of time shall be adjusted according to the proportionate increase or decrease in the final total cost of the work unless negotiated on another basis.

Except for over-runs in contract unit price items, no extra (additional) work shall be done except upon a written Change Order from the Engineer, and no claim on the part of the Contractor for pay for extra (additional) work shall be recognized unless so ordered in writing by the Engineer.

63. SEPARATE CONTRACTS

The Owner reserves the right to let other contracts in connection with this Work. The Contractor shall afford other contractors reasonable opportunity for ingress, egress, storage of their materials, the execution of their work, and shall properly connect and coordinate his work with theirs. The respective rights of various interests involved shall be established by the Engineer to secure proper completion of the various portions of the Work.

If the proper execution or results of any part of the Contractor's Work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

64. OWNER'S RIGHT TO DO WORK

If the Contractor should neglect or fail to prosecute the Work properly or fail or refuse to perform any provision of the Contract, the Owner, after ten (10) days written notice to the Contractor, may without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from any monies due or which may thereafter become due to the Contractor.

65. SUSPENSION OF WORK

The Owner shall have authority to suspend the Work in whole or in part by giving five (5) days notice to the Contractor in writing. The written notice shall fix the date on which the Work shall be resumed, and the Contractor shall resume the Work on the date so fixed. The Owner shall reimburse the Contractor for expenses incurred by him in connection with the Work under this Contract as a result of such suspension if the suspension of the Work is caused through no fault of the Contractor himself.

66. RIGHT OF OWNER TO TERMINATE CONTRACT

If the Contractor fails to begin the Work under the Contract within the specified time, or fails to perform the Work with sufficient workmen and equipment or with sufficient materials to insure the prompt completion of said Work within the specified time, or shall, in the opinion of the Engineer, perform the Work improperly, or shall neglect or refuse to remove materials or perform anew such Work as shall be rejected as defective or unsuitable or shall be stopped by court order resulting from injunctive action, or shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of five (5) days, or shall fail or refuse to remove within forty-eight (48) hours after receipt of proper notice, any employee or person engaged in work under the Contract, or shall make an assignment for the benefit of creditors or from any other cause whatsoever shall not carry out the Work in an acceptable manner, the Owner shall give notice in writing to the Contractor and his surety, of such delay, neglect, or default, specifying the same, and if the Contractor within a period of ten (10) days after such notice shall not proceed in accordance therewith, then the Owner shall, upon written certificate from the Engineer of the face of such delay, neglect or default, and the Contractor's failure to comply with such notice, have full power and authority without violating the Contract to terminate the Contractor's right to proceed with the Work, to take over the prosecution of the work of said Contractor, to appropriate or use any and all materials and equipment on the ground as may be suitable and acceptable, and may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, and use such other methods as in the Owner's opinion shall be required for the completion of said Contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the Work under Contract, shall be deducted from any monies due or which may become due said Contractor. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the Contract, if it had been completed by said Contractor, then the Contractor shall be entitled to receive the difference, and in case such expense shall exceed the sum which would have been payable under the

Contract, then the Contractor and/or his surety shall be liable and shall pay to the Owner the amount of said excess.

After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Contract. In such case, the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.

67. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court, or other public authority, for a period of three (3) months, through no fault of the Contractor or of anyone employed by him, or if the Engineer should fail to issue any estimate of payment in approximately (60) days after it is due, or if the Owner shall fail to pay the Contractor in approximately (60) days of its maturity and presentation of any sum certified by the Engineer or award by arbitrators, then the Contractor may, upon fifteen (15) days written notice to the Owner and the Engineer, terminate this Contract and recover from the Owner payment for all work executed, plus loss sustained upon any plant or materials, plus reasonable profit and damages.

In addition and in lieu of terminating the Contract, if the Engineer has failed to make any payment as aforesaid, the Contractor may upon ten (10) days notice to the Owner and the Engineer stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

68. USING COMPLETED PORTION OF WORK

The Owner shall have the right to take possession of and use any completed portion or portions of the Work even though the time of completing the entire work or such portions may not have expired. The possession and use by the Owner shall not be deemed an acceptance of any work not completed in accordance with the Contract. If such prior use increases the cost of or delays the Work, the Contractor shall be entitled to such extra compensation, or extension of time, or both as the Engineer may determined. The use by the Owner of any portion of the Work shall release the Contractor from his Builders Risk Insurance covering such portion used.

69. ACCEPTANCE AND FINAL PAYMENT

Upon written notice from the Contractor that the work is ready for final inspection, the Engineer will make such an inspection and subsequent inspections as required. When, in the Engineer's opinion, the Work is acceptable under the Contract, he will promptly issue a Certificate of Acceptance.

Upon acceptance of the Work by the Owner, the balance due the Contractor including the percentage retained during the construction period, will then be paid in approximately sixty (60) days, and said final payment shall evidence the Owner's acceptance of the Work unless the Owner has made acceptance or partial acceptance thereof in writing prior to said final payment.

Before the Owner makes final payment, the Contractor shall submit to the Owner a final release, as described hereinafter, stating that all payrolls, material bills, subcontractors, and other indebtedness connected with the Work have been paid and providing for handling claims that may be outstanding or that may arise after the settlement.

Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents or the Performance Bond and Payment Bond.

70. CONTRACTOR'S FINAL RELEASE

Before the Owner pays the Contractor his final payment on the Work, the Contractor will be required to sign a final release as set out hereinbefore. This final release shall be notarized and shall state that all claims against the Owner on the Contractor's part have been met in full; it shall further state that all accounts for labor performed, materials furnished, liens, judgments and claims of every nature against the Contractor have been satisfied by him. It shall further state that any obligation or lawsuit whatsoever arising from the Contractor's operations on the Project which may be presented or filed after the settlement shall be borne by the Contractor. In case the Contractor is unable to settle any claim that may be in dispute or litigation, the Owner may allow him to furnish a proper bond to indemnify the Owner against the claim and then release the final payment to him.

It is understood that the Contractor is to guarantee to the Owner all construction against defective materials, equipment and workmanship for a period of twelve (12) months after acceptance, and shall take immediate steps to correct or replace such defective materials, equipment or workmanship without cost to the Owner.

71. FINAL CLEAN-UP

The Work will not be considered as completed, and final payment will not be made, until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer.

- END OF SECTION -

DIVISION 1

GENERAL REQUIREMENTS

KENTUCKY ENGINEERING GROUP, PLLC

SECTION 01010

SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Work covered by the Contract Documents.
2. Sequence of Operations.
3. Utility Shutdowns
4. Tie-ins and Disconnections
5. Temporary Systems
6. Use of premises.
7. Specification formats and conventions.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. The Contractor shall provide all material, services, labor, tools and equipment, necessary to construct this project. The following is a brief description of the major work items included in the contract: Construction of approximately 8,500 LF main line, 30 meter reconnects and replacement of service line, replacement of 1 master meter vault including all related appurtenances as shown on the Drawings and described in the Specifications.

1.03 SEQUENCE OF OPERATIONS

A. Water mains are to be installed contiguously from beginning to end.

B. Sterilization, testing, and sampling of the new water main will be completed prior to abandoning the existing water main.

1.04 UTILITY SHUTDOWNS

A. One-week advance notice to the Owner is required prior to performing any utility shutdown unless of an emergency in nature.

B. Contractor shall know where all existing valves are located on the project and shall be able to shut down expeditiously in case of line breaks.

C. The existing water line is shown as an approximate location on the plans. The contractor shall field verify the existing water main locations. Contractor shall work closely with the Bracken County Water District personnel.

1.05 TIE-INS AND DISCONNECTIONS

A. Contractor shall furnish all materials and shall provide excavation, de-watering, scaffolding and support operations to support tie-ins.

1.06 TEMPORARY SYSTEM (S)

A. All temporary water lines and hoses shall be depressurized and all temporary electrical lines and equipment de-energized when not in use and at the end of each workday.

1.07 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Division and Sections using the 17-division format.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01015

WORK SEQUENCE

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall submit to the Engineer for review and acceptance a complete schedule of his proposed sequence of construction operations prior to commencement of work. However, the Engineer shall not accept a construction schedule that fails to utilize the entire time allocated for the construction of the water system extension. This schedule requirement in no way prevents the Contractor from completing the project in a shorter time frame than scheduled. The construction schedule shall be submitted and approved by the Owner prior to the submittal of the first partial payment request. A revised construction schedule shall be submitted with every subsequent partial payment request. This revised schedule must be approved by the Owner prior to payment. The contractor shall use the following sequence of construction while working on the new water mains for the Bracken County Water District, Contract 1 - KY 19 Master Meter to Kelly Ridge project.

1. Locate all existing valves and make sure they are workable
2. Notify the Bracken County Water District a minimum of 48 hours prior to connecting into any existing line
3. Install new water main using extreme caution not to damage existing water lines or services
4. **Contractor shall not abandon any portion of the existing water main until all connections have been completed.**
5. **Contractor is responsible for any repairs to the existing line during construction.**

1.02 RELATED WORK

A. Section 01010 - Summary of Work.

1.03 ADDITIONAL INFORMATION

Any delays caused by the Contractor shall be at his expense and at no cost to the Owner or Engineer.

- END OF SECTION -

SECTION 01016

OCCUPANCY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall be aware that after each major portion of the project is completed, the Contractor shall notify the Engineer that those specific operations are complete and prior to replacing that portion of the work into service shall request an interim inspection of the work to be returned to or placed into service.

B. The interim inspection requested by the Contractor shall not preclude or supersede the final inspection of the project or reduce the Contractor's responsibility for the completed portion prior to final acceptance of the work by the Owner.

C. The Contractor shall provide all necessary temporary controls and other items required for operation of all work placed into service prior to final acceptance as required. At such time as new controls, etc. are complete and functioning, the Contractor shall remove all temporary installed items.

- END OF SECTION -

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, equipment, service, other necessary supplies and perform all work, including all excavation and backfilling (without additional compensation, except where specifically set out in these specifications) at the unit or lump sum prices for the following items.

1.02 PROGRESS AND PAYMENTS SCHEDULES

A. Within ten (10) days after the date of formal execution of the AGREEMENT, the Contractor shall prepare and submit to the Engineer, for approval, a construction schedule which depicts the Contractor's plan for completing the contract requirements and show work placement in dollars versus contract time. The Contractor's construction schedule must be approved by the Engineer before any payments will be made on this contract.

B. Within ten (10) days after the date of formal execution of the CONTRACT AGREEMENT, the Contractor shall prepare and submit to the Engineer, for approval, a periodic estimate which depicts the Contractor's cost for completing the contract requirements and show by major unit of the project work, the Contractor's dollar value for the material and the labor (two separate amounts) to be used as a basis for the periodic payments. The Contractor's periodic estimate must be approved by the Engineer before any payments will be made on this contract.

C. The Engineer's decision as to sufficiency and completeness of the Contractor's construction schedule and periodic estimate will be final.

D. The Contractor must make current, to the satisfaction of the Engineer, the construction schedule and periodic estimate each time he requests a payment on this contract.

E. The Contractor's construction schedule and periodic estimate must be maintained at the construction site available for inspection and shall be revised to incorporate approved change orders as they occur.

F. When the Contractor requests a payment on this contract, it must be on the approved periodic estimate and be current. Further, the current periodic estimate and construction schedule (both updated and revised) shall be submitted for review and approval by the Engineer before monthly payments will be made by the Owner. The Contractor shall submit six (6) current copies of each (periodic estimate and construction schedule) when requesting payment.

1.03 CONDITIONS FOR PAYMENT

A. The Owner will make payments for acceptable work in place and materials properly stored on-site. The value of payment shall be as established on the approved construction schedule and periodic estimate, EXCEPT the Owner will retain ten percent (10%) of the work in place and a percentage as hereinafter listed for items properly stored or untested.

B. No payment will be made for stored materials unless a proper invoice from the supplier is attached to the pay request. Further, no item whose value is less than $1,000 will be considered as stored materials for pay purposes.

C. Payment for pipeline items shall be limited to eighty percent (80%) of the bid price until the pipeline items have been tested and clean up has been completed and accepted by the Engineer.

D. Payment for equipment items shall be limited to eighty-five percent (85%) of their scheduled value (materials portion only) until they are set in place. Eighty-five percent (85%) for stored materials and equipment shall be contingent on proper on-site storage as recommended by the manufacturer or required by the Engineer.

E. Payment for equipment items set in place shall be limited to ninety percent (90%) of their scheduled value until they are ready for operation and have been certified by the manufacturer. Ninety percent (90%) payment for installed equipment shall be contingent on proper routine maintenance of the equipment in accordance with the manufacturer's recommendations.

F. Payment for equipment items set in place and ready for operation shall be limited to ninety-five percent (95%) of their scheduled value until all acceptance tests have been completed and the required manufacturer's pre-startup operator's training has been completed.

G. Payment for the labor portion of equipment items will be subject only to the degree of completeness and the appropriate retainage.

H. The retainage shall be an amount equal to 10% of said estimate. The retainage on the equipment items shall be 10% as defined hereinbefore.

I. If at any time thereafter when the progress of the WORK is not satisfactory or determine that the Contractor is not making satisfactory progress, additional amounts may be retained.

1.04 CLAIMS FOR EXTRA WORK

A. If the Contractor claims that any instructions by Drawings or otherwise involve extra cost, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions and, in any event before proceeding to execute the work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.

B. Claims for additional compensation for extra work, due to alleged errors in spot elevations, contour lines or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material or performing more work than would reasonably be estimated from the Drawings and topographical maps issued.

C. Any discrepancies which may be discovered between actual conditions and those represented by the topographical maps and Drawings shall at once be reported to the Engineer, and work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Engineer.

D. If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract Price or time is justifiable, the procedure shall then be as provided herein for "Changes in the Work".

E. By execution of this Contract, the Contractor warrants that he has visited the site of the proposed work and fully acquainted himself with the conditions there existing relating to construction and labor, and that he fully understands the facilities, difficulties and restrictions attending the execution of the work under this Contract. The Contractor further warrants that he has thoroughly examined and is familiar with the Drawings, Specifications and all other documents comprising the Contract. The Contractor further warrants that by execution of this Contract his failure when he was bidding on this Contract to receive or examine any form, instrument or document, or to visit the site and acquaint himself with conditions there existing, in no way relieves him from any obligation under the Contract, and the Contractor agrees that the Owner

shall be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.

1.05 DETERMINATION OF THE VALUE OF EXTRA (ADDITIONAL) OR OMITTED WORK

A. The value of extra (additional) or omitted work shall be determined in one or more of the following ways:

1. On the basis of the actual cost of all the items of labor (including on-the-job supervision), materials and use of equipment, plus a maximum 20% for added work or a minimum 20% for deleted work which shall cover the Contractor's general supervision, overhead and profit. In case of subcontracts, the sum of total overhead amounts of the subcontractors and Contractor, plus total profit amounts for the subcontracts and Contractor shall not exceed 25% of the cost. Subcontractors shall be limited to 15% and Contractors shall be limited to 10% for combined overhead and profit. The cost of labor shall include required insurance, taxes and fringe benefits. Contractor to provide detailed breakdown of all cost as justification of change in work. Equipment costs shall be based on current rental rates in the areas where the work is being performed, but in no case shall such costs be greater than the current rates published by the Associated Equipment Distributors, Chicago, Illinois.

2. By estimate and acceptance in a lump sum.

3. By unit prices named in the Contract or subsequently agreed upon.

B. Provided, however, that the cost or estimated cost of all extra (additional) work shall be determined in advance of authorization by the Engineer and approved by the Owner.

C. All extra (additional) work shall be executed under the conditions of the original Contract. Any claim for extension of time shall be adjusted according to the proportionate increase or decrease in the final total cost of the work unless negotiated on another basis.

D. Except for over-runs in contract unit price items, no extra (additional) work shall be done except upon a written change Order from the Engineer, and no claim on the part of the Contractor for pay for extra (additional) work shall be recognized unless so ordered in writing by the Engineer.

PART 2 - PRODUCTS

2.01 WATER MAIN

A. Payment for installing the water main will be made at the contract unit price per linear foot, complete in place, which shall include compensation for furnishing pipe, trenching (including rock excavation), earth or Class I material bedding, copper wire, thrust blocking, earth backfill, grip rings, fittings, crushed stone, copper wire, caution tape, pavement replacement, asphalt replacement, sidewalk repair or replacement, disinfection, clean up and restoration of all disturbed areas, including seeding and mulching as required, testing, bonding, and all appurtenances required. The quantity of water mains to be paid for shall be the length of the completed line as measured along its centerline without any deduction for lengths of fittings, valves or other appurtenances.

B. Casing for sewer main, and sewer lateral crossings, as described in the plan sheets will be incidental to laying the main water line. There will be no additional compensation for these pvc casings. Please figure these costs into the water line price.

C. Use of crushed stone bedding on the water main will be determined in the field by the engineer if quality bedding material is not available. Please figure bedding costs into the water line price.

2.02 TAPPING SLEEVE AND VALVE

Payment for tapping sleeves and valves shall be made at the contract unit price each, complete in place including all excavation, material, tapping sleeve, tapping valve, box, concrete collar and other items required to make a complete and workable tap. Connection to the existing water main will be paid per 2.03.

2.03 CUT AND PLUG EXISTING WATER MAIN

Payment for cutting and plugging the existing water main shall include all materials and labor necessary for completing the disconnection of the existing water line. This will be paid per cut and plug and will include piping, mechanical joint cap, grip rings, concrete blocking and other appurtenances required to complete the installation. Size of the piping will be paid as one price and will not be differentiated.

2.04 OPEN CUT CASING

Payment for water mains crossing major creeks or streams shall include excavation, rock excavation, concrete, rip-rap, crushed stone, gravel backfill, anchors, PVC/Steel casing pipe (whichever one is called for on the contract drawings), spacers and end seals. The length of the creek crossing to be paid for shall be measured from end to end of the encasement pipe. Where casing is required the carrier pipe shall be Yelomine® or approved equal and shall be paid separately under item 2.01.

2.05 GATE VALVES AND BOXES

Payment for furnishing and installing gate valves and valve boxes with covers in water mains will be made at the contract unit price each, complete in place, which shall include compensation for furnishing, hauling, trenching (including rock excavation), bedding, laying, jointing, backfilling, concrete supports and concrete collars.

Each valve shall also include installation of a valve box protector ring with copper locator pin installed within the protector ring.

2.06 RECONNECT EXISTING CUSTOMER SERVICES

Payment for re-connecting an existing service line to a new or existing water main will be paid on a per unit basis. This shall include all materials and labor including saddle, corporation stop, required service tubing, fittings, inserts and pushing under the existing road to complete the installation. This item shall also include any necessary relocation of the existing meter box and all related appearances.

2.07 MASTER METER VAULT AND APPURTANCES

A. Payment for the master meter vault will be paid on a lump sum basis as shown on the construction plans. This shall include all materials and labor necessary for completing the installation and shall also include the concrete vault, hatch, drain pipe, gravel, the meter, strainer, fittings, pipe supports, piping, test port(s), valves, and connections to existing water main that are represented in the detail drawing.

(NOTE: All rock excavation, crushed stone bedding, and asphalt replacement shall be included in the per unit price for pipe. No additional payment will be provided for these items)

PART 3 - EXECUTION

3.01 PAY ITEMS

A. The pay items listed herein before refer to the items listed in the Bid Schedule and cover all of the pay items under the base bid for this contract.

B. Any and all other items of work listed in the specifications or shown on the Contract Drawings for this contract shall be considered incidental to and included in those pay items.

3.02 QUANTITIES OF ESTIMATE

A. Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents, including the Bid Proposal, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this Contract, and such increase or diminution shall not give cause for claims or liability for damages. The Engineer will not be financially responsible for any omissions from the Contract Documents and therefore not included by the Contractor in his proposal.

B. Aerial photographs utilized for plan sheets in the Contract Documents are indicated at an approximate scale and shall not be scaled for quantity take-offs. The pipeline quantities listed in the Bid Schedule are given for use in comparing bids and may not be the actual quantities to be installed. It is the Contractor's responsibility to field verify the length and quantities of pipeline to be installed prior to the ordering of materials. Payment on unit price contracts are based on actual quantities installed. The Owner or Engineer will not be financially responsible for any shortage of pipe or overrun of pipe ordered for the pipeline quantities.

C. The actual quantities of all materials to be used for this project shall be field verified prior to the Contractor ordering the necessary materials. The quantity listed in the bid schedule is given for use in comparing bids and may increase or diminish as may be deemed necessary or as directed by the Owner. Any such increase or diminution shall not give cause for claims or liability for damages. The Engineer or Owner will not be financially responsible for any charges incurred for restocking of materials ordered.

- END OF SECTION -

SECTION 01030

LABOR PROVISIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall conform to all provisions of the Kentucky Department of Labor, Wage Decisions (latest revisions), relative to minimum wages and hours as they may apply to the work to be accomplished under these specifications.

B. In addition to the above, certain Federal laws and regulations shall govern the work and shall supplement or supplant the Kentucky Department of Labor Wage Decisions cited above, as the case may be.

1.02 RELATED SECTIONS

A. Section 3 - Part 1 Hours and Wages

1.03 WAGE RATES

Prevailing wage rates apply to this job. The Contractor will utilize, when feasible, local labor and will pay them wages commensurate with the wages prevailing in the Community.

1.04 LABOR PREFERENCE

Where feasible, the Contractor will utilize local labor.

1.05 HOURS OF WORK

A. Hours of work shall be as set out in Kentucky Department of Labor Wage Decisions (latest revisions); that is, not more than eight (8) hours in one calendar day, nor more than forty (40) hours in one week, except in case of emergency caused by fire, flood or damage to life and property.

B. Any laborer, workman, mechanic, helper, assistant or apprentice working in excess of forty (40) hours per week, except in case of emergency, shall be paid not less than 1-1/2 times the wage rate. Whenever overtime work is scheduled, the Contractor shall give prior notice to the Owner.

- END OF SECTION -

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.01 COORDINATION OF THE WORK

The Contractor shall coordinate the work of all the crafts, trades and subcontractors engaged on the Work, and he shall have final responsibility as regards the schedule, workmanship and completeness of each and all parts of the Work.

All crafts, trades and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work which adjoins, incorporates, precedes or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to the execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade and subcontractor shall be made responsible to the Owner, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing and cleaning as required to satisfactorily perform the Work.

The Contractor shall be responsible for all cutting, digging and other action of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to the Owner.

Each subcontractor is expected to be familiar with the General Requirements and all sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work to the end that complete coordination between trades will be affected. Each Contractor shall consult with the Engineer if conflicts exist on the Drawings.

The Contractor shall conduct testing of water lines in a timely manner. The Contractor shall make provisions to test all water lines regardless of whether or not planned pump stations have been delivered and/or installed.

- END OF SECTION -

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED

Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All SUBMITTALS shall be furnished in at least six (6) copies and shall be checked, reviewed and signed by the Contractor before submission to the Engineer. The review of the Drawings by the Engineer shall not be construed as a complete check but only for conformance with the design concept of the Project and for compliance with information given in the Contract Documents. Review of such drawings will not relieve the Contractor of the responsibility for any errors that may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. General Provision.

B. Section 01720 - Project Record Documents (As-Builts).

1.03 DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

1.04 GENERAL CONDITIONS

A. Review by the Engineer of shop drawings or SUBMITTALS of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quality, quantity, materials and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents.

B. Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

1.05 GENERAL REQUIREMENTS FOR SUBMITTALS

A. Shop Drawings:

1. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Drawings. Where applicable, show fabrication, layout, setting and erection details.

2. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or

erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus two (2) which will be retained by the Engineer. Shop drawings shall be folded to an approximate size of 8-1/2" x 11" and in such manner that the title block will be located in the lower righthand corner of the exposed surface.

B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.

D. All submittals shall be referenced to the applicable item, section and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s).

E. The Contractor shall review and check SUBMITTALS, and shall indicate his review by initials and date.

F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefor. All changes shall be clearly marked on the submittal with a bold red mark. Any additional costs for modifications shall be borne by the Contractor.

G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.

H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.

I. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing leads, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.

J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.

K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.

L. Where manufacturers' brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.

M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.

N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

1.06 CONTRACTOR RESPONSIBILITIES

A. Verify field measurements, field construction criteria, catalog numbers and similar data.

B. Coordinate each submittal with requirements of Work and of Contract Documents.

C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.

D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

- END OF SECTION -

SECTION 01450

QUALITY CONTROL

PART 1 - GENERAL

1.01 QUALITY CONTROL

A. Work of all crafts and trades shall be laid out to lines and elevations as established by the Contractor from the Drawings or from instructions by the Engineer.

B. Unless otherwise shown, all work shall be plumb and level, in straight lines and true planes, parallel or square to the established lines and levels. The Work shall be accurately measured and fitted to tolerance as established by the best practices of the crafts and trades involved, and shall be as required to fit all parts of the Work carefully and neatly together.

C. All equipment, materials and articles incorporated into the Work shall be new and of comparable quality as specified. All workmanship shall be first-class and shall be performed by mechanics skilled and regularly employed in their respective trades.

1.02 TESTS, INSPECTIONS, AND CERTIFICATIONS OF MATERIALS

A. Tests, inspections and certifications of materials, equipment, subcontractors or completed work, as required by the various sections of the Specifications shall be obtained by the Contractor and all costs shall be included in the Contract Price.

B. The Contractor shall submit to the Engineer the name of testing laboratory to be used.

C. Contractor shall deliver written notice to the Engineer at least 24 hours in advance of any inspections or tests to be made at the Project site. All inspections, tests, samples for water quality or other procedures requiring the Engineer to attest to be conducted in the field shall be done in the presence of the Engineer or his representative.

D. Certifications by independent testing laboratories may be by copy of the attestation(s) and shall give scientific procedures and results of tests. Certifications by persons having interest in the matter shall be by original attest properly sworn to and notarized.

- END OF SECTION -

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall make his own provisions for temporary electricity and water and maintain strict supervision of use of temporary utility services as follows:

1. Enforce compliance with applicable standards.
2. Enforce safety practices
3. Prevent abuse of services.
4. Pay all utility charges required.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. The Contractor shall obtain and pay for all permits as required by governing authorities.

B. Obtain and pay for temporary easements required across property other than that of Owner or that is shown on the Contract Drawings.

C. The Contractor shall comply with applicable codes.

1.03 REMOVAL

A. The Contractor shall completely remove temporary materials, equipment, and offices upon completion of construction.

B. The Contractor shall repair damage caused by installation and restore to specified or original condition.

1.04 TEMPORARY LIGHTING

A. The Contractor shall furnish and install temporary lighting required for:

1. Construction needs.
2. Safe and adequate working conditions.
3. Public Safety.
4. Security lighting.
5. Temporary office and storage area lighting.

B. Service periods for safety lighting shall be as follows:

1. Within construction area: All times that authorized personnel are present.
2. Public areas: At all times.

C. Costs of Installation and Preparation: Contractor shall pay all installation, maintenance and removal costs of temporary lighting.

D. Maintenance of temporary lighting service (replacement of bulbs, etc.) shall be the sole responsibility of the General Contractor.

1.05 TEMPORARY WATER

The Contractor shall provide the water necessary for testing and disinfection. Water purchased from the owner for flushing and testing shall be paid for at the whole sale price by the contractor. The Contractor shall supply his own hoses, chlorine for disinfection, etc.

1.06 SANITARY FACILITIES

Contractor shall provide sanitary facilities as set forth in General Provisions (GP-2.04.Sanitary Regulations).

1.07 FIELD OFFICE (Office Trailer not Required for this Contract)

The Contractor shall make his own provisions for providing the electricity, telephone, gas, water, sewer, and other utilities to his office trailer that are required or as necessary for completion of the work.

The Contractor shall be responsible for all utility charges.

PART 2 - PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 IMPLEMENTATION

B. The Contractor shall provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to storm drains, adjacent areas and walkways prior to the start of any site work.

C. Straw bale dikes, silt fencing and synthetic filter fabric shall be used as necessary to protect adjacent lands, surface waters, and vegetation to achieve environmental objectives.

D. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Soil deposited on pavement by construction and other contractor vehicles shall be removed and the pavement swept as required.

F. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

G. Minimize amount of bare soil exposed at one time.

H. Provide temporary measures such as berms, dikes, drains, hay bales, gabions, etc., as directed by the Engineer so as to minimize siltation due to runoff.

I. Construct fill and waste areas by selective placement to avoid erosive exposed surface of silts or clays.

J. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

3.02 OPERATION AND MAINTENANCE

A. The Contractor shall inspect, repair, and maintain erosion and sediment control measures until final stabilization has been established.

3.03 REMOVAL OF FACILITIES

A. The Contractor shall remove the temporary facilities after final stabilization has been established. Used devices (including old straw bales) shall be disposed of as Construction & Demolition debris.

3.04 DUST CONTROL

A. Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

- END OF SECTION -

SECTION 01530

BARRIERS

PART 1 - GENERAL

1.01 WORK INCLUDED

Temporary Railing: Temporary railing shall be provided around open pits and other locations where needed, to prevent accidents or injury to persons.

1.02 COST

The Contractor shall pay all costs for temporary railing.

- END OF SECTION -

SECTION 01540

SECURITY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide barricades, lanterns and other such signs and signals as may be necessary to warn of the dangers in connection with open excavation and obstructions.

B. Provide an adequate and approved system to secure the Project area at all times, especially during non-construction periods; the Contractor shall be solely responsible for taking proper security measures.

1.02 COSTS

Contractor shall pay all costs for protection and security systems.

- END OF SECTION -

SECTION 01570

TRAFFIC REGULATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Construction parking control.

B. Flagmen.

C. Flares and lights.

D. Haul routes.

E. Traffic signs and signals.

F. Removal.

1.02 RELATED REQUIREMENTS

A. Section 01530 - Barriers.

B. Section 01580 - Project Identification and Signs.

PART 2 - PRODUCTS

2.01 SIGNS, SIGNALS AND DEVICES

A. Post-mounted and wall-mounted traffic control and informational signs as specified and required by local jurisdictions.

B. Automatic Traffic Control Signals: As approved by local jurisdictions.

C. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

D. Flagman Equipment: As required by local jurisdictions.

PART 3 - EXECUTION

3.01 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.

C. Prevent parking on or adjacent to access roads or in nondesignated areas.

3.02 TRAFFIC CONTROL

A. Whenever and wherever, in the Engineer's opinion, traffic is sufficiently congested or public safety is endangered, Contractor shall furnish uniformed officers to direct traffic and to keep traffic off the highway area affected by construction operations.

B. Contractor shall abide by City regulations governing utility construction work.

C. Traffic control shall be provided according to the Kentucky Department of Highways Manual on Uniform Traffic Control Devices for Streets and Highways.

3.03 FLAGMEN

Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.05 HAUL ROUTES

A. Consult with authorities, establish public thoroughfares to be used for haul routes and site access.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.06 TRAFFIC SIGNS AND SIGNALS

A. At approaches to site and on site, install appropriate signs at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.

C. Relocate as work progresses, to maintain effective traffic control.

3.07 REMOVAL

Remove equipment and devices when no longer required. Repair damage caused by installation. Remove post settings to a depth of 2 feet.

- END OF SECTION -

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall provide all signs required by these specifications near the site of the work. The sign shall set forth the description of the work and the names of the Owner, Engineer and Contractor as shown on the Plans or in these Specifications.

B. The Contractor shall furnish and install One (1) sign on the Project. One sign shall conform to the specifications and painted as shown on Figure I on the following page. The location of signs shall be determined by the Owner and/or Engineer at the pre-construction meeting.

PART 2 - PRODUCT

2.01 SIGN

The sign shall be constructed of 3/4" thick APA A-B Exterior grade or marine plywood. Posts shall be 4" x 4" of fencing type material. Prime all wood with white primer. Sign shall be as shown in Figure I and II.

PART 3 - EXECUTION

3.01 MAINTENANCE

The sign shall be maintained in good condition until completion of the Project.

3.02 LOCATION

The location of the project signs shall be determined at the pre-construction conference after the contract has been awarded.

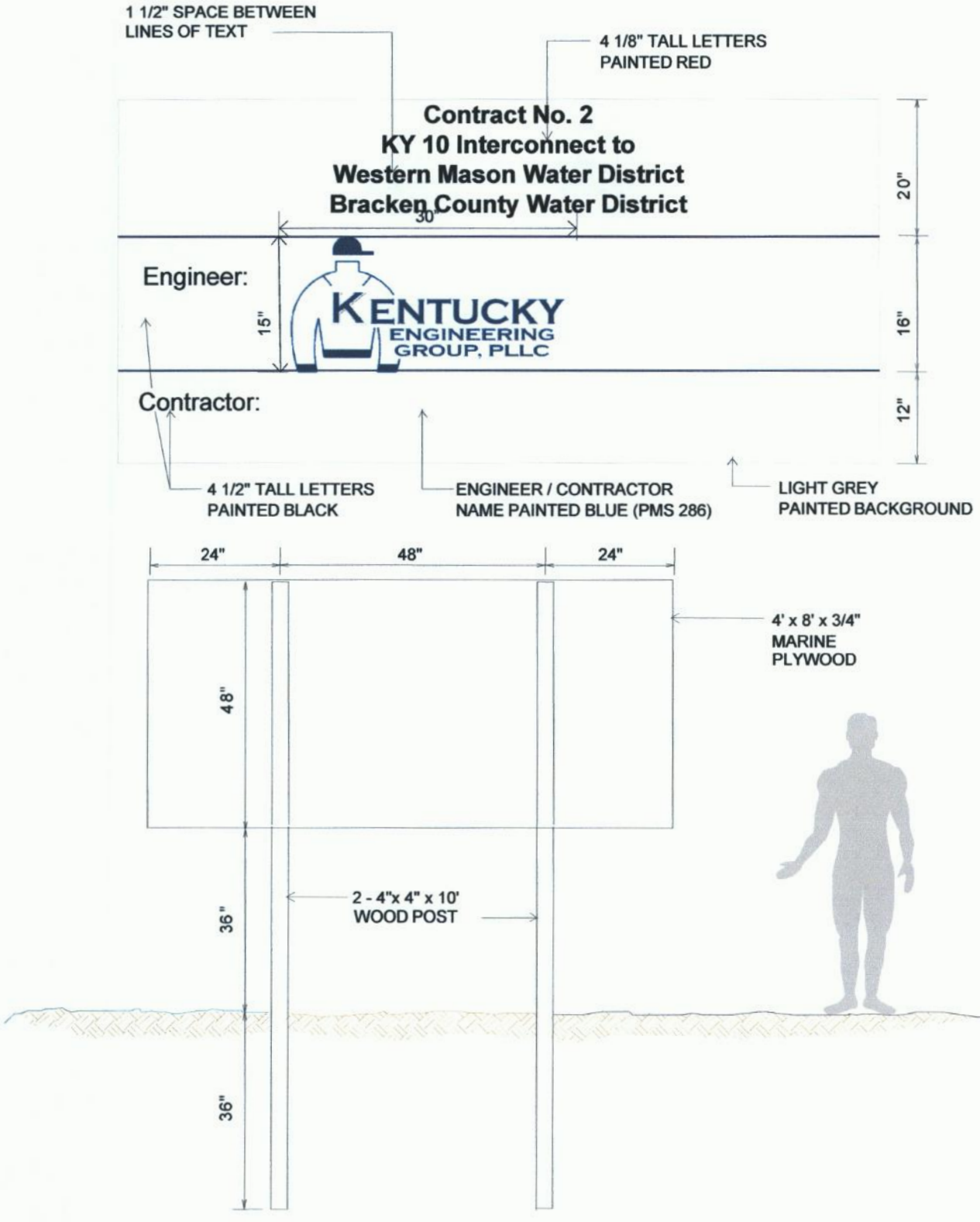


FIGURE 1

01580-2

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 COMPLIANCE WITH SAFETY REGULATIONS

The equipment items furnished shall comply with all governing Federal and State laws regarding safety, including all requirements of the Occupational Safety and Health Act of 1970 (OSHA).

PART 2 - PRODUCTS

2.01 REFERENCES

A. General Provisions: Section 10 Correction and Guarantee of Work, Section 13 Materials and Equipment.

B. Section 02600 – Pipe, Fittings, and Installation

C. Section 02640 - Valves.

D. All material shall meet applicable American Water Works Association (AWWA), American Standard Testing Methods (ASTM), Underwriters Laboratories (UL), Factory Mutual (FM), National Sanitation Foundation (NSF) standards.

BRACKEN COUNTY WATER DISTRICT

The following is a list of manufacturers for the materials that may be provided on the project. All material shall meet applicable AWWA, ASTM, Underwriters Laboratories, and Factory Mutual standards. The Owner and Engineer shall approve actual materials during shop drawing review.

MATERIAL/ITEM	APPROVED MANUFACTURER
Air Release Valve (Water and Sewer)	Apco, ARI, Primer Corp or Approved Equal
All Brass Fittings (AWWA brass)	Mueller
Aluminum Hatch	Bil-Co or Approved Equal
Blowoff Hydrant Assembly	Hydrants shall be post type Model No. A-411 as manufactured by Mueller Co. or Approved Equal.
Blowoff Assembly (Underground)	Hydrants shall be Model No. A-412 as manufactured by Mueller Co. or Approved Equal.
Bolted Cast Couplings	Dresser, Smith & Blair, Ford, Viking-Johnson, JCM, Powerseal or Approved Equal
Brass Nipples and Pipe	State Origin

MATERIAL/ITEM	APPROVED MANUFACTURER
Brass Service Saddles	Mueller
Butterfly Valves (Class 150)	Mueller Lineseal III
Butterfly Valves (Class 250)	Mueller Lineseal XP
Casing Spacers	State Origin
Check Valve	Valve shall be those manufactured by Mueller, Kennedy, American Flow Control, or Approved Equal.
Control Valve	n/a
Copper Tracing Wire 14 AWG	State Origin
Customer Individual Pressure Reducing Valve	Watts N55BUM1 or Approved Equal
Customer Meter	Badger (Orion) Radio Read
Customer Meter Box Cover	Mid States Plastic box w/ Raised CI lid
Customer Meter Setter	Mueller
DI and Cast Iron Full Body Tapping Sleeves	Mueller, Clow, US Pipe, American Flow or Approved Equal or Approved Equal
DI Double Strap Service Saddles	Mueller, Ford, Smith & Blair, JCM or Approved Equal
DI Pipe Class 350	Griffin, Clow, US Pipe, American DI Pipe or Approved Equal
Dual Disc Check Valve	Valve shall be Series #8800 (class 125) as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL. USA. or Approved Equal.
Fire Hydrant	Mueller® Super Centurion 250 ® Model A-423 or Approved Equal
Flushing Hydrant Assembly	Mueller® – Super Centurion 250, Model No. A-423 or Approved Equal
Full Circle Repair Clamps (all stainless steel)	Mueller, Smith & Blair, Ford, Powerseal, Cascade or Approved Equal
Galvanized Compression Couplings	Smith & Blair, Dresser, JCM, Powerseal or Approved Equal
Gate Valves	Mueller Resilient Seat or Approved Equal
Individual Pressure Reducing Valve	Watts Model No. N55BUM1 or Approved Equal
Mainline Pressure Reducing Valve	n/a
Manhole Ring and Cover	J. R. Hoe & Sons or Approved Equal
MJ Fittings Compact/Full Body MJ Packs	McWayne (Tyler/Union, Clow), Griffin, US Pipe, American DI Pipe or Approved Equal
Precast Concrete Manholes	Cloud, Sherman-Dixie or Approved Equal
PVC Couplings	JM Manufacturing, Harrington, Multi-Fittings or Approved Equal
PVC Pipe Class 200 or C900	Diamond, JM Manufacturing, Napco, Freedom, ETI, National, Pioneer or Approved Equal

MATERIAL/ITEM	APPROVED MANUFACTURER
Restraint Joint Collar Fittings	Mueller, McWayne, Ford, EBBA or Approved Equal
Service Tubing – Polyethylene Tubing (CTS Service Tubing)	Domestic
Service Tubing - Type K Copper Soft	Domestic
Steel Tapping Valves and Sleeves (Check Working Pressure)	Mueller, Kennedy, Ford or Approved Equal
Underground Blowoff Hydrant Assembly	Mueller Model No. A-412 or Approved Equal
Underground Detectable Tape	Shall be Lineguard brand encased aluminum foil, Type III. The identification tape is manufactured by Lineguard, Inc., P. O. Box 426, Wheaton, IL 60187 or Approved Equal
Underground Tracer Wire Anchor System	Valve Box Protector Ring w/copper locator pin

-END OF SECTION-

SECTION 01610

TRANSPORTATION AND HANDLING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Handling and Distribution:

1. The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.

2. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

B. Storage of Materials and Equipment: All excavated materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or the existing facilities and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

- END OF SECTION -

SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Liquidated Damages: General Provisions-11.20. CHARGES FOR DELAY CAUSED BY THE CONTRACTOR

B. Cleaning: Section 01710.

C. Project Record Documents: Section 01720.

1.02 SUBSTANTIAL COMPLETION

A. Contractor:

1. Submit written certification to Engineer that project is substantially complete.

2. Submit list of major items to be completed or corrected.

B. Engineer will make an inspection within seven days after receipt of certification, together with Owner's Representative.

C. Should Engineer consider that work is substantially complete:

1. Contractor shall prepare, and submit to Engineer, a list of items to be completed or corrected, as determined by the inspection.

2. Engineer will prepare and issue a Certificate of Substantial Completion, containing:

a. Date of Substantial Completion.

b. Contractor's list of items to be completed or corrected, verified and amended by Engineer.

c. The time within which Contractor shall complete or correct work of listed items.

d. Time and date Owner will assume possession of work or designated portion thereof.

e. Responsibilities of Owner and Contractor for:

(1) Insurance
(2) Utilities
(3) Operation of mechanical, electrical and other systems.
(4) Maintenance and cleaning.
(5) Security

f. Signatures of:

(1) Engineer.
(2) Contractor.
(3) Owner.

3. Owner occupancy of Project or Designated Portion of Project:

a. Contractor shall:

(1) Obtain certificate of occupancy.
(2) Perform final cleaning in accordance with Section 01710.

b. Owner will occupy Project, under provisions stated in Certificate of Substantial Completion.

4. Contractor shall complete work listed for completion or correction, within designated time.

D. Should Engineer consider that work is not substantially complete.

1. He shall immediately notify Contractor, in writing, stating reasons.

2. Contractor shall complete work, and send second written notice to Engineer, certifying that Project, or designated portion of Project is substantially complete.

3. Engineer will reinspect work.

1.03 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.

2. Project has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in presence of Owner's Representative and are operational.

5. Project is completed and ready for final inspection.

B. Engineer will make final inspection within seven (7) days after receipt of certification.

C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.

D. Should Engineer consider that work is not finally complete:

1. He shall notify Contractor, in writing, stating reasons.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.

3. Engineer will reinspect work.

1.04 FINAL CLEAN UP

The Work will not be considered as completed and final payment made until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer. See Section 01710 for detailed requirements.

1.05 CLOSEOUT SUBMITTALS

Project Record Documents: To requirements of Section 01720.

1.06 FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications in accordance with requirements of GENERAL PROVISIONS.

1.07 FINAL CERTIFICATE FOR PAYMENT

A. Engineer will issue final certificate in accordance with provisions of GENERAL PROVISIONS.

B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Semi-Final Certificate for Payment.

- END OF SECTION -

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. During its progress the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.

B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, by work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.

C. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organics in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

D. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of the work shall deliver it undamaged and in fresh and new appearing condition.

E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition equal or better than that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

1.02 DESCRIPTION

A. Related Requirements Specified Elsewhere:

1. Project Closeout: Section 01700.

2. Cleaning for Specific Products or Work: Specification Section for that work.

B. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish, caused by operations.

C. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

1.03 SAFETY REQUIREMENTS

A. Hazards Control:

1. Store volatile wastes in covered metal containers, and remove from premises daily.

2. Prevent accumulation of wastes, which create hazardous conditions.

3. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations in compliance with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or fuel in open drainage ditches or storm or sanitary drains.

3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to minimize blowing dust.

C. At reasonable intervals during progress of Work, clean site and public properties, and dispose of waste materials, debris and rubbish.

D. Provide on-site containers for collection of waste materials, debris and rubbish.

E. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off construction site.

F. The Contractor shall thoroughly clean all materials and equipment installed.

3.02 FINAL CLEANING

A. Employ experienced workmen, or professional cleaners, for final cleaning.

B. In preparation for substantial completion, conduct final inspection of project area(s).

C. Broom clean paved surfaces; rake clean other surfaces of grounds.

D. Maintain cleaning until Project, or portion thereof, is accepted by Owner.

- END OF SECTION -

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall obtain from the Engineer, one (1) set of prints of the Contract Drawings. These prints shall be kept and maintained in good condition at the project site and a qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual "as-built" record of the construction progress. Entries and notations shall be made in a neat and legible manner and these prints shall be delivered to the Engineer upon completion of the construction. APPROVAL FOR FINAL PAYMENT WILL BE CONTINGENT UPON COMPLIANCE WITH THIS PROVISION.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

A. Section 01300 - Submittals.

B. General Provisions – Kentucky Engineering Group, PLLC

1.03 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:

1. Contract Drawings
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Change Orders
6. Other Modifications to Contract

B. Store documents in approved location, apart from documents used for construction.

C. Provide files and racks for storage of documents.

D. Maintain documents in clean, dry legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by Engineer and Owner.

1.04 MARKING DEVICES

Provide colored pencil or felt-tip marking pen for all marking.

1.05 RECORDING

A. Label each document "PROJECT RECORD" in 2-inch high printed letters.

B. Keep record documents current.

C. Do not permanently conceal any work until required information has been recorded.

D. Contract Drawings: Legibly mark to record actual construction:

1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

3. Field changes of dimension and detail.

4. Changes made by Change Order or Field Order.

5. Details not on original Contract Drawings.

E. Specifications and Addenda: Legibly mark up each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Change Order or Field Order.

3. Other matters not originally specified.

F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.06 SUBMITTAL

A. At completion of project, deliver record documents to Engineer.

B. Accompany submittal with transmittal letter, in duplicate, containing:

1. Date.

2. Project Title and Number.

3. Contractor's Name and Address.

4. Title and Number of each Record Document.

5. Certification that each Document as Submitted is Complete and Accurate.

6. Signature of Contractor, or his authorized Representative.

- END OF SECTION -

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Related requirements specified elsewhere:

1. Bid Bond: Instructions to Bidders.

2. Performance and Payment Bonds: General Provisions.

3. Guaranty: General Provisions.

4. General Warranty of Construction: General Provisions.

5. Project Closeout: Section 01700.

6. Warranties and Bonds required for specific products: As listed herein.

7. Provisions of Warranties and Bonds, Duration: Respective specification sections for particular products.

8. Operating and Maintenance Data: Section 01730.

1.02 SUBMITTALS REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.

B. Furnish two (2) original signed copies.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product, equipment or work item.

2. Firm name, address and telephone number.

3. Scope

4. Date of beginning of warranty, bond or service and maintenance contract.

5. Duration of warranty, bond or service and maintenance contract.

6. Provide information for Owner's personnel:

   a. Proper procedure in case of failure.

   b. Instances which might affect the validity of warranty or bond.

7. Contractor name, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 in. x 11 in., punch sheets for 3-ring binder: Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

   a. Title of Project.

   b. Name of Contractor.

C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.04 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during progress of construction: Submit documents within 10 days after inspection and acceptance.

B. Otherwise, make submittals within 10 days after date of substantial completion, prior to final request for payment.

C. For items of work, where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing the date of acceptance as the start of the warranty period.

1.05 SUBMITTALS REQUIRED

Submit warranties, bonds, service and maintenance contracts as specified in the respective sections of the Specifications.

- END OF SECTION -

DIVISION 2

SITE WORK

KENTUCKY ENGINEERING GROUP, PLLC

SECTION 02110

SITE CLEARING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Clear site within construction limits of plant life.

B. Remove grass and topsoil in area of access road and foundation.

C. Remove root system of trees and shrubs.

D. Remove surface debris

1.02 RELATED WORK

A. Section 02228 - Rock Removal.

B. Section 02211 - Rough Grading.

C. Section 02222 - Excavation.

1.03 REGULATORY REQUIREMENTS

Conform to applicable local codes and ordinances for disposal of debris.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 CLEARING

A. Clear areas required for access to site and execution of work.

B. Remove trees, shrubs, brush, and other vegetable matter such as snags, bark, and refuse.

3.02 PROTECTION

The Contractor shall not cut or injure any trees or other vegetation outside the easement lines and outside the areas to be cleared, as indicated on the Drawings, without written permission from the Engineer. The Contractor shall be responsible for all damage done outside these lines.

3.03 GRUBBING

From areas to be grubbed, the Contractor shall remove completely all stumps, remove to a depth of at least 24 inches below subgrade elevation all roots larger than 1 1/2 in. in diameter, and remove to a depth of 12 in. all roots larger than 1/2 in. in diameter. Such depths shall be measured from the existing ground surface, the proposed finished grade or subgrade, whichever is lower.

3.04 STRIPPING

All stumps, roots, foreign matter, topsoil, loam, and unsuitable earth shall be stripped from the ground surface. The topsoil and loam shall be utilized insofar as possible, for finished surfacing. Loam shall not be taken from the site.

3.05 DISPOSAL

A. All material resulting from clearing and grubbing and not scheduled for reuse or stockpiling shall become the property of the Contractor and shall be suitably disposed of off site, unless otherwise directed by the Engineer, in accordance with all applicable laws, ordinances, rules and regulations.

B. Such disposal shall be performed as promptly as possible after removal of the material and shall not be left until the final period of cleaning up.

3.06 FENCES

Wherever fences need to be removed to provide access to the work or are damaged during the progress of work, they shall be restored or repaired to as good a condition as existed prior to construction at the Contractor's expense.

- END OF SECTION -

SECTION 02220

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes excavation and backfilling including the loosening, removing, refilling, transporting, storage and disposal of all materials classified as "earth" necessary to be removed for the construction and completion of all work under the Contract, and as shown on the Contract Drawings, specified or directed.

1.02 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

   a. A328 Specification for Steel Sheet Piling

   b. D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)

   c. D1556 Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

   d. D1760 Specification for Pressure Treatment of Timber Products

   e. D2922 Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

1.03 DEFINITIONS

A. Excavation (or Trenching)

1. Grubbing, stripping, removing, storing and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to the construction and completion of all the work under construction.

2. All sheeting, sheetpiling, bracing and shoring, and the placing, driving, cutting off and removing of the same.

3. All diking, ditching, fluming, cofferdamming, pumping, bailing, draining, well pointing, or otherwise disposing of water.

4. The removing and disposing of all surplus materials from the excavations in the manner specified.

5. The maintenance, accommodation and protection of travel and the temporary paving of highways, roads and driveways.

6. The supporting and protecting of all tracks, rails, buildings, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, shrubbery, pipes, sewers, conduits or other structures or property in the vicinity of the work, whether over- or underground or which appear within or adjacent to the excavations, and the restoration of the same in case of settlement or other injury.

7. All temporary bridging and fencing and the removing of same.

B. Earth

1. All materials such as sand, gravel, clay, loam, ashes, cinders, pavements, muck, roots or pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.

C. Backfill

1. The refilling of excavation and trenches to the line of filling indicated on the Contract Drawings or as directed using materials suitable for refilling of excavations and trenches; and the compacting of all materials used in filling or refilling by rolling, ramming, watering, puddling, etc., as may be required.

D. Spoil

1. Surplus excavated materials not required or not suitable for backfills or embankments.

E. Embankments

1. Fills constructed above the original surface of the ground or such other elevation as specified or directed.

F. Limiting Subgrade

1. The underside of the pipe barrel for pipelines
2. The underside of footing lines for structures

G. Excavation Below Subgrade

1. Excavation below the limiting subgrades of structures or pipelines.

2. Where materials encountered at the limiting subgrades are not suitable for proper support of structures or pipelines, the Contractor shall excavate to such new lines and grades as required.

PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

A. Wood Sheeting and Bracing

1. Shall be sound and straight; free from cracks, shakes and large or loose knots; and shall have dressed edges where directed.

2. Shall conform to National Design Specifications for Stress Grade Lumber having a minimum fiber stress of 1200 pounds per square inch.

3. Sheeting and bracing to be left-in-place shall be pressure treated in accordance with ASTM D1760 for the type of lumber used and with a preservative approved by the Engineer.

B. Steel Sheeting and Bracing

1. Shall be sound

2. Shall conform to ASTM A328 with a minimum thickness of 3/8 inch.

PART 3 EXECUTION

3.01 UNAUTHORIZED EXCAVATION

A. Whenever excavations are carried beyond or below the lines and grades shown on the Contract Drawings, or as given or directed by the Engineer, all such excavated space shall be refilled with special granular materials, concrete or other materials as the Engineer may direct. All refilling of unauthorized excavations shall be at the Contractor's expense.

B. All material which slides, falls or caves into the established limits of excavations due to any cause whatsoever, shall be removed and disposed of at the Contractor's expense and no extra compensation will be paid the Contractor for any materials ordered for refilling the void areas left by the slide, fall or cave-in.

3.02 REMOVAL OF WATER

A. General

1. The Contractor shall at all times provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of pipes, structures, or other work.

2. Unless otherwise specified, all excavations which extend down to or below the static groundwater elevations shall be dewatered by lowering and maintaining the groundwater beneath such excavations at all times when work thereon is in progress, during subgrade preparation and the placing of the structure or pipe thereon.

3. Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar, until at least 24 hours after placement, and no stream of water shall be allowed to flow over such work until such time as the Engineer may permit.

4. Where the presence of fine grained subsurface materials and a high groundwater table may cause the upward flow of water into the excavation with a resulting quick or unstable condition, the Contractor shall install and

operate a well point system to prevent the upward flow of water during construction.

5. Water pumped or drained from excavations, or any sewers, drains or water courses encountered in the work, shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, or to pavements, roads, drives, and water courses. No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of by an approved method.

6. Any damage caused by or resulting from dewatering operations shall be the sole responsibility of the Contractor.

B. Work Included

1. The construction and removal of cofferdams, sheeting and bracing, and the furnishing of materials and labor necessary therefor.

2. The excavation and maintenance of ditches and sluiceways.

3. The furnishing and operation of pumps, well points, and appliances needed to maintain thorough drainage of the work in a satisfactory manner.

C. Well Point Systems

1. Installation

a. The well point system shall be designed and installed by or under the supervision of an organization whose principal business is well pointing and which has at least five consecutive years of similar experience and can furnish a representative list of satisfactory similar operations.

b. Well point headers, points and other pertinent equipment shall not be placed within the limits of the excavation in such a manner or location as to interfere with the laying of pipe or trenching operations or with the excavation and construction of other structures.

c. Detached observation wells of similar construction to the well points shall be installed at intervals of not less than 50 feet along the opposite side of the excavation from the header pipe and line of well points, to a depth of at least 5 feet below the proposed excavation. In addition, one well point in every 50 feet shall be fitted with a tee, plug and valve so that the well point can be converted for use as an observation well. Observation wells shall be not less than 1-½ inches in diameter.

d. Standby gasoline or diesel powered equipment shall be provided so that in the event of failure of the operating equipment, the standby equipment can be readily connected to the system. The standby equipment shall be maintained in good order and actuated regularly not less than twice a week.

2. Operation

a. Where well points are used, the groundwater shall be lowered and maintained continuously (day and night) at a level not less than 2 feet

below the bottom of the excavation. Excavation will not be permitted at a level lower than 2 feet above the water level as indicated by the observation wells.

b. The effluent pumped from the well points shall be examined periodically by qualified personnel to determine if the system is operating satisfactorily without the removal of fines.

c. The water level shall not be permitted to rise until construction in the immediate area is completed and the excavation backfilled.

3.03 STORAGE OF MATERIALS

A. Sod

1. Any sod cut during excavation shall be removed and stored during construction so as to preserve the grass growth. Sod damaged while in storage shall be replaced in like kind at the sole expense of the Contractor.

B. Topsoil

1. Topsoil suitable for final grading shall be removed and stored separately from other excavated material.

C. Excavated Materials

1. All excavated materials shall be stored in locations so as not to endanger the work, and so that easy access may be had at all times to all parts of the excavation. Stored materials shall be kept neatly piled and trimmed, so as to cause as little inconvenience as possible to public travel or to adjoining property holders.

2. Special precautions must be taken to permit access at all times to fire hydrants, fire alarm boxes, police and fire department driveways, and other points where access may involve the safety and welfare of the general public.

3.

3.04 DISPOSAL OF MATERIALS

A. Spoil Material

1. All spoil materials shall be disposed of as required by the local, state or federal regulations pertaining to the area or as described in the Special Provisions or on the Contract Drawings.

2. The surface of all spoil areas shall be graded and dressed and no unsightly mounds or heaps shall be left on completion of the work.

3.05 SHEETING AND BRACING

A. Installation

1. The Contractor shall furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, injure the pipe, structures, or other work; diminish the width necessary for construction;

otherwise damage or delay the work of the Contract; endanger existing structures, pipes or pavements; or cause the excavation limits to exceed the right-of-way limits.

2. In no case will bracing be permitted against pipes or structures in trenches or other excavations.

3. Sheeting shall be driven as the excavation progresses, and in such manner as to maintain pressure against the original ground at all times. The sheeting shall be driven vertically with the edges tight together, and all bracing shall be of such design and strength as to maintain the sheeting in its proper position. Seepage which carries fines through the sheeting shall be plugged to retain the fines.

4. Where breast boards are used between soldier pile, the boards shall be back packed with soil to maintain support.

5. The Contractor shall be solely responsible for the adequacy of all sheeting and bracing.

B. Removal

1. In general, all sheeting and bracing, whether of steel, wood or other material, used to support the sides of trenches or other open excavations, shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a pipe or structural foundation shall not be withdrawn, unless otherwise directed, before more than 6 inches of earth is placed above the top of the pipe or structural foundation and before any bracing is removed. The voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

2. The Contractor shall not remove sheeting and bracing until the work has attained the necessary strength to permit placing of backfill.

C. Left in Place

1. If, to serve any purpose of his own, the Contractor files a written request for permission to leave sheeting or bracing in the trench or excavation, the Engineer may grant such permission, in writing, on condition that the cost of such sheeting and bracing be assumed and paid by the Contractor.

2. The Contractor shall leave in place all sheeting, shoring and bracing which are shown on the Contract Drawings or specified to be left in place or which the Engineer may order, in writing, to be left in place. All shoring, sheeting and bracing shown or ordered to be left in place will be paid for under the appropriate item of the Contract. No payment allowance will be made for wasted ends or for portions above the proposed cutoff level which are driven down instead of cut-off.

3. In case sheeting is left in place, it shall be cut off or driven down as directed so that no portion of the same shall remain within 12 inches of the street subgrade or finished ground surface.

3.06 BACKFILLING

A. General

1. All excavations shall be backfilled to the original surface of the ground or to such other grades as may be shown, specified or directed.

2. Backfilling shall be done with suitable excavated materials which can be satisfactorily compacted during refilling of the excavation. In the event the excavated materials are not suitable, Special Backfill as specified or ordered by the Engineer shall be used for backfilling.

4. Any settlement occurring in the backfilled excavations shall be refilled and compacted.

B. Unsuitable Materials

1. Stones, pieces of rock or pieces of pavement greater than 1 cubic foot in volume or greater than 1.5 feet in any single dimension shall not be used in any portion of the backfill.

2. All stones, pieces of rock or pavement shall be distributed through the backfill and alternated with earth backfill in such a manner that all interstices between them shall be filled with earth.

3. Frozen earth shall not be used for backfilling.

C. Compaction and Density Control

1. The compaction shall be as specified for the type of earthwork, i.e., structural, trenching or embankment.

   a. The compaction specified shall be the percent of maximum dry density.

   b. The compaction equipment shall be suitable for the material encountered.

2. Where required, to assure adequate compaction, in-place density test shall at the expense of the Contractor be made by an approved testing laboratory.

   a. The moisture-density relationship of the backfill material shall be determined by ASTM D698, Method D.

      1) Compaction curves for the full range of materials used shall be developed.

   b. In-place density shall be determined by the methods of ASTM D1556 or ASTM D2922 and shall be expressed as a percentage of maximum dry density.

3. Where required, to obtain the optimum moisture content, the Contractor shall add, at his expense, sufficient water during compaction to assure the specified maximum density of the backfill. If, due to rain or other causes, the material exceeds the optimum moisture content, it shall be allowed to dry, assisted if necessary, before resuming compaction or filling efforts.

4. The Contractor shall be responsible for all damage or injury done to pipes, structures, property or persons due to improper placing or compacting of backfill.

3.07 OTHER REQUIREMENTS

A. Drainage

1. All material deposited in roadway ditches or other water courses shall be removed immediately after backfilling is completed and the section, grades and contours of such ditches or water courses restored to their original condition, in order that surface drainage will be obstructed no longer than necessary.

B. Unfinished Work

1. When, for any reason, the work is to be left unfinished, all trenches and excavations shall be filled and all roadways, sidewalks and watercourses left unobstructed with their surfaces in a safe and satisfactory condition. The surface of all roadways and sidewalks shall have a temporary pavement.

C. Hauling Material on Streets

1. When it is necessary to haul material over the streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the crosswalks, streets and pavements clean and free from dirt, mud, stone and other hauled material.

D. Dust Control

1. It shall be the sole responsibility of the Contractor to control the dust created by any and all of his operations to such a degree that it will not endanger the safety and welfare of the general public.

2. Calcium chloride and petroleum products shall not to be used for dust control.

E. Test Pits

1. For the purpose of obtaining detail locations of underground obstructions, the Contractor shall make excavations in advance of the work. Payment for the excavations ordered by the Engineer will be made under an appropriate item of the Contract and shall include sheeting, bracing, pumping, excavation and backfilling.

- END OF SECTION -

SECTION 02222

EXCAVATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Structure excavation.

B. Shoring excavations.

1.02 RELATED WORK

A. Geotechnical Report in Appendix A of these specifications. (None provided or available for this Contract)

B. Section 01450 - Quality Control.

C. Section 02228 - Rock Removal.

D. Section 02211 - Rough Grading.

E. Section 02220 - Backfilling and Embankments.

F. Section 02226 - Trenching.

1.03 REGULATORY REQUIREMENTS

A. Protect excavations by shoring, bracing, sheet piling, underpining, or other methods required to prevent cave-in or loose soil from falling into excavation.

B. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

C. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

E. Grade excavation top perimeter to prevent surface water run-off into excavation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Subsoil: Excavated material, graded free of lumps larger than 12 inches, rocks larger than 12 inches, and debris.

B. # 57's or # 9's: Mineral aggregate graded 1/4 inch to 5/8 inch, free of soil, subsoil, clay, shale, or foreign matter.

PART 3 - EXECUTION

3.01 PREPARATION

Identify required liens, levels, contours, and datum.

3.02 EXCAVATION

A. Excavate subsoil required for structure foundations, construction operations, and other work. All excavation shall be unclassified excavation.

B. Contractor is responsible to adequately brace open cuts and protect workmen and equipment from cave-in.

C. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd., measured by volume. Remove larger material under Section 02228.

D. Correct unauthorized excavation at no cost to Owner.

E. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Engineer.

F. Stockpile excavated material in area designated on site.

3.03 FIELD QUALITY CONTROL

Provide for visual inspection of rock surfaces under provisions of Section 01450.

- END OF SECTION -

SECTION 02226

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes excavation and backfill as required for pipe installation or other construction in the trench, and removal and disposal of water, in accordance with the applicable provisions of the Section entitled "Earthwork" unless modified herein.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 EXCAVATION

A. The trench excavation shall be located as shown on the Contract Drawings or as specified. Under ordinary conditions, excavation shall be by open cut from the ground surface. Where the depth of trench and soil conditions permit, tunneling may be required beneath cross walks, curbs, gutters, pavements, trees, driveways, railroad tracks and other surface structures. No additional compensation will be allowed for such tunneling over the price bid for open cut excavation of equivalent depths below the ground surface unless such tunnel excavation is specifically provided for in the Contract Documents.

B. Trenches shall be excavated to maintain the depths as shown on the Contract Drawings or as specified for the type of pipe to be installed.

C. The alignment and depth shall be determined and maintained by the use of a string line installed on batter boards above the trench, a double string line installed along side of the trench or a laser beam system.

D. The minimum width of trench excavation shall be 6-inches on each side of the pipe hub for 21-inch diameter pipe and smaller and 12-inches on each side of the pipe hub for 24-inch diameter pipe and larger.

E. Trenches shall not be opened for more than 300 feet in advance of pipe installation nor left unfilled for more than 100 feet in the rear of the installed pipe when work is in progress without the consent of the Engineer. Open trenches shall be protected and barricaded as required.

F. Bridging across open trenches shall be constructed and maintained where required.

3.02 SUBGRADE PREPARATION FOR PIPE

A. Where pipe is to be laid on undisturbed bottom of excavated trench, mechanical excavation shall not extend lower than the finished subgrade elevation at any point.

B. Where pipe is to be laid on special granular material the excavation below subgrade shall be to the depth specified or directed. The excavation below subgrade shall be refilled with special granular material as specified or directed, shall be deposited in layers not to exceed 6 inches and shall be thoroughly compacted prior to the preparation of pipe subgrade.

C. The subgrade shall be prepared by shaping with hand tools to the contour of the pipe barrel to allow for uniform and continuous bearing and support on solid undisturbed ground or embedment for the entire length of the pipe.

D. Pipe subgrade preparation shall be performed immediately prior to installing the pipe in the trench. Where bell holes are required they shall be made after the subgrade preparation is complete and shall be only of sufficient length to prevent any part of the bell from becoming in contact with the trench bottom and allowing space for joint assembly.

3.03 STORAGE OF MATERIALS

A. Traffic shall be maintained at all times in accordance with the applicable Highway Permits. Where no Highway Permit is required at least one-half of the street must be kept open for traffic.

B. Where conditions do not permit storage of materials adjacent to the trench, the material excavated from a length as may be required, shall be removed by the Contractor, at his cost and expense, as soon as excavated. The material subsequently excavated shall be used to refill the trench where the pipe had been built, provided it be of suitable character. The excess material shall be removed to locations selected and obtained by the Contractor.

1. The Contractor shall, at his cost and expense, bring back adequate amounts of satisfactory excavated materials as may be required to properly refill the trenches.

C. If directed by the Engineer, the Contractor shall refill trenches with select fill or other suitable materials and excess excavated materials shall be disposed of as spoil.

3.04 REMOVAL OF WATER AND DRAINAGE

A. The Contractor shall at all times provide and maintain proper and satisfactory means and devices for the removal of all water entering the trench, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work.

B. The removal of water shall be in accordance with the Section entitled "Earthwork".

3.05 PIPE EMBEDMENT

A. All pipe shall be protected from lateral displacement and possible damage resulting from superimposed backfill loads, impact or unbalanced loading during backfilling operations by being adequately embedded in suitable pipe embedment material. To ensure adequate lateral and vertical stability of the installed pipe during pipe jointing and embedment operations, a sufficient amount of the pipe embedment material to hold the pipe in rigid alignment shall be uniformly deposited and thoroughly compacted on each side, and back of the bell, of each pipe as laid.

B. Concrete cradle and encasement of the class specified shall be installed where and as shown on the Contract Drawings or ordered by the Engineer. Before any concrete is placed, the pipe shall be securely blocked and braced to prevent movement or flotation. The concrete cradle or encasement shall extend the full width of the trench as excavated unless otherwise authorized by the Engineer. Where concrete is to be placed in a sheeted trench it shall be

poured directly against sheeting to be left in place or against a bond-breaker if the sheeting is to be removed.

C. Embedment materials placed above the centerline of the pipe or above the concrete cradle to a depth of 12 inches above the top of the pipe barrel shall be deposited in such manner as to not damage the pipe. Compaction shall be as required for the type of embedment being installed.

3.06 BACKFILL ABOVE EMBEDMENT

A. The remaining portion of the pipe trench above the embedment shall be refilled with suitable materials compacted as specified.

1. Where trenches are within the ditch-to-ditch limits of any street or road or within a driveway or sidewalk, or shall be under a structure, the trench shall be refilled in horizontal layers not more than 8 inches in thickness, and compacted to obtain 95% maximum density, and determined as set forth in the Section entitled "Earthwork".

2. Where trenches are in open fields or unimproved areas outside of the ditch limits of roads, the backfilling may be by placing the material in the trench and mounding the surface.

3. Hand tamping shall be required around buried utility lines or other subsurface features that could be damaged by mechanical compaction equipment.

B. Backfilling of trenches beneath, across or adjacent to drainage ditches and water courses shall be done in such a manner that water will not accumulate in unfilled or partially filled trenches and the backfill shall be protected from surface erosion by adequate means.

1. Where trenches cross waterways, the backfill surface exposed on the bottom and slopes thereof shall be protected by means of stone or concrete rip-rap or pavement.

C. All settlement of the backfill shall be refilled and compacted as it occurs.

D. Temporary pavement shall be placed as specified in the Section entitled "Restoration of Surfaces".

-END OF SECTION-

SECTION 02228

ROCK REMOVAL

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes removal to the widths and depths shown on the Contract Drawings or as directed by the Engineer, including the loosening, removing, transporting, storing and disposal of all materials requiring blasting, barring, or wedging for removal from their original beds, and backfill of rock excavations with acceptable materials

B. Use of explosives for rock removal shall be used only with prior permission from both the Engineer and Owner. **Blasting will NOT be permitted in this project.**

C. Rock removal is part of and incidental to unclassified excavation. No separate payment shall be made for rock removal.

1.02 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Before any blasting operations begin the Contractor shall obtain all permits and licenses required.

1.03 DEFINITIONS

A. Rock

1. All pieces of ledge or bedrock, boulders or masonry larger than one-half cubic yard in volume.

2. Any material requiring blasting, barring, or wedging for removal from its original bed.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 BLASTING **(Use of explosives for rock removal shall be used only with prior permission from both the Engineer and Owner.)**

A. General

1. Handling of explosives and blasting shall be done only by experienced persons.

2. Handling and blasting shall be in accordance with all Federal, State and local laws, rules and regulations relating to the possession, handling, storage and transportation and use of explosives.

3. All blasts in open cut shall be properly covered and protected with approved blasting mats.

4. Charges shall be of such size that the excavation will not be unduly large and shall be so arranged and timed that adjacent rock, upon or against which pipelines or structures are to be built, will not be shattered.

5. Blasting will not be permitted within 25 feet of pipelines or structures.

6. All existing pipes or structures exposed during excavation shall be adequately protected from damage before proceeding with the blasting.

7. NFPA 495 - Code for Manufacture, Transportation, Storage and Use of Explosive Materials.

8. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

B. Repair of Damages Due to Blasting

1. Any injury or damage to the work or to existing pipes or structures shall be repaired or rebuilt by the Contractor at his expense.

2. Whenever blasting may damage adjacent rock, pipes or structures, blasting shall be discontinued and the rock removed by drilling, barring, wedging or other methods.

C. Explosives

1. At no time shall an excessive amount of explosives be kept at the site of the work. Such explosives shall be stored, handled and used in conformity with all applicable laws and regulations.

2. Accurate daily records shall be kept showing the amounts of explosives on hand, both at the site and at any storage magazine, the quantities received and issued, and the purpose for which issued.

3. The Contractor shall be responsible for any damage or injury to any persons, property or structures as a result of his handling, storage or use of explosives.

D. Rock Clearance in Trenches

1. Ledge rock, boulders and large stones shall be removed from the sides and bottom of the trench to provide clearance for the specified embedment of each pipe section, joint or appurtenance; but in no instance shall the clearance be less than 6 inches. Additional clearance at the pipe bell or joint shall be provided to allow for the proper make-up of the joint.

2. At the transition from an earth bottom to a rock bottom the minimum bottom clearance shall be 12 inches for a distance of not less than 5 feet.

E. Rock Clearance at Structures

1. Concrete for structures shall be placed directly on the rock and the excavation shall be only to the elevations and grades shown on the Contract Drawings.

3.02 EXCAVATION AND BACKFILL

A. Rock removal and backfilling shall be performed in accordance with the applicable provisions of the Section entitled "Earthwork".

B. The rock excavated which cannot be incorporated into the backfill material, as specified, shall be disposed of as spoil and shall be replaced with the quantity of acceptable material required for backfilling.

-END OF SECTION-

SECTION 02270

SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall do all work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to adjacent property.

B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction. The Contractor shall be responsible for obtaining all associated permits.

C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Temporary Slope Protection and Erosion Control:

Bales may be hay or straw, and shall be reasonably clean and free of noxious weeds and deleterious materials. Filter fabric for sediment traps shall be of suitable materials acceptable to the Engineer.

B. Permanent Slope Protection and Erosion Control:

On slopes 2H:1V and steeper, and where shown on the drawings place Type A Dumped Rock Fill with a 24-inch minimum thickness over non-woven geotextile filter fabric.

PART 3 - EXECUTION

3.01 METHODS OF CONSTRUCTION

A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches and settling basins.

B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area which must be entered for the construction of temporary or permanent facilities. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.

C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions shall be constructed to

intercept and divert runoff water away from critical areas. Diversion outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.

D. For work within easements, all materials used in construction such as excavation, backfill, roadway, and pipe bedding and equipment shall be kept within the limits of the easements.

E. The Contractor shall not pump silt-laden water from trenches or other excavations into the wetlands, or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps to ensure that only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.

F. Prohibited construction procedures include, but are not limited to, the following:

1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.

2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.

3. Pumping of silt-laden water from trenches or excavations into surface waters, or wetlands.

4. Damaging vegetation adjacent to or outside of the construction area limits.

5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.

6. Permanent or unauthorized alteration of the flow line of any stream.

7. Open burning of debris from the construction work.

G. Any temporary working roadways required shall be clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign fill materials shall be removed from the site following construction.

3.02 EROSION CHECKS

The Contractor shall furnish and install baled hay or straw erosion checks in all locations indicated on the Drawings, surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer. Checks, where indicated on the Drawings, shall be installed immediately after the site is cleared and before trench excavation is begun at the location indicated. Checks located surrounding stored material shall be located approximately 6 ft. from that material. Bales shall be held in place with two 2 in. by 2 in. by 3 ft. wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short circuiting of the erosion check.

- END OF SECTION -

SECTION 02502

RESTORATION OF SURFACES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes restoration and maintenance of all types of surfaces, sidewalks, curbs, gutters, culverts and other features disturbed, damaged or destroyed during the performance of the work under or as a result of the operations of the Contract.

B. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to the condition of each before the work began.

1.02 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a. D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)

1.03 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. A schedule of restoration operations. After an accepted schedule has been agreed upon it shall be adhered to unless otherwise revised with the approval of the Engineer.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 GENERAL

A. In general, permanent restoration of paved surfaces will not be permitted until one months' time has elapsed after excavations have been completely backfilled as specified. A greater length of time, but not more than nine months may be allowed to elapse before permanent restoration of street surfaces is undertaken, if additional time is required for shrinkage and settlement of the backfill.

B. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the Contractor of responsibility to repair damages by settlement or other failures.

3.02 TEMPORARY PAVEMENT

A. Immediately upon completion of refilling of the trench or excavation, the Contractor shall place a temporary pavement over all disturbed areas of streets, driveways, sidewalks, and other traveled places where the original surface has been disturbed as a result of his operations.

B. Unless otherwise specified or directed the temporary pavement shall consist of compacted run-of-crusher limestone to such a depth as required to withstand the traffic to which it will be subjected.

C. Where concrete pavements are removed, the temporary pavement shall be surfaced with "cold patch". The surface of the temporary pavement shall conform to the slope and grade of the area being restored.

D. For dust prevention, the Contractor shall treat all surfaces, not covered with cold patch, as frequently as may be required.

E. The temporary pavement shall be maintained by the Contractor in a safe and satisfactory condition until such time as the permanent paving is completed. The Contractor shall immediately remove and restore all pavement as shall become unsatisfactory.

3.03 PERMANENT PAVEMENT REPLACEMENT

A. The permanent and final repaving of all streets, driveways and similar surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the Contractor, by a new and similar pavement.

1. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet the current specifications of the local community for the particular types of pavement.

2. Where the local community has no specification for the type of pavement, the work shall be done in conformity with the State Department of Transportation Standard which conforms the closest to the type of surfacing being replaced, as determined by the Engineer.

3.04 PREPARATION FOR PERMANENT PAVEMENT

A. When scheduled and within the time specified, the temporary pavement shall be removed and a base prepared, at the depth required by the local community or Highway Permit, to receive the permanent pavement.

1. The base shall be brought to the required grade and cross-section and thoroughly compacted before placing the permanent pavement.

2. Any base material which has become unstable for any reason shall be removed and replaced with compacted base materials.

B. Prior to placing the permanent pavement all service boxes, manhole frames and covers and similar structures within the area shall be adjusted to the established grade and cross-section.

C. The edges of existing asphalt pavement shall be cut a minimum of 1 foot beyond the excavation or disturbed base whichever is greater.

1. All cuts shall be parallel or perpendicular to the centerline of the street.

3.05 ASPHALT PAVEMENT

A. The permanent asphalt pavement replacement for streets, driveways and parking area surfaces shall be replaced with bituminous materials of the same depth and kind as the existing unless otherwise specified.

B. Prior to placing of any bituminous pavement a sealer shall be applied to the edges of the existing pavement and other features.

C. The furnishing, handling and compaction of all bituminous materials shall be in accordance with the State Department of Transportation Standards.

3.06 CONCRETE PAVEMENT AND PAVEMENT BASE

A. Concrete pavements and concrete bases for asphalt, brick or other pavement surfaces shall be replaced with Class "B" Concrete, air-entrained.

B. Paving slabs or concrete bases shall be constructed to extend 1 foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than 2 feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base unless otherwise indicated on the Contract Drawings.

C. Where the edge of the pavement slab or concrete base slab falls within the excavation, the excavation shall be backfilled with Special Backfill compacted to 95% maximum dry density as determined by ASTM D 698 up to the base of the concrete.

D. The new concrete shall be of the same thickness as the slab being replaced and shall contain reinforcement equal to the old pavement.

1. New concrete shall be placed and cured in accordance with the applicable provisions of the State Department of Transportation Standards.

3.07 STONE OR GRAVEL PAVEMENT

A. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.

1. The depth of the stone or gravel shall be at least equal to the existing.

2. After compaction the surface shall conform to the slope and grade of the area being replaced.

3.08 CONCRETE WALKS, CURBS AND GUTTER REPLACEMENT

A. Concrete walks, curbs and gutters removed or damaged in connection with or as a result of the construction operations shall be replaced with new construction.

1. The minimum replacement will be a flag or block of sidewalk and 5 feet of curb or gutter.

B. Walks shall be constructed of Class "B" concrete, air-entrained with KY-DOT #2 stone aggregate on a 4-inch base of compacted gravel or stone.

1. The walk shall be not less than 4 inches in thickness or the thickness of the replaced walk where greater than 4 inches, shall have construction joints spaced not more than 25 feet apart, shall have expansion joints spaced not more than 50 feet apart and shall be sloped at right angles to the longitudinal centerline approximately inch per foot of width.

C. 1/2-inch expansion joint material shall be placed around all objects within the sidewalk area as well as objects to which the new concrete will abut, such as valve boxes, manhole frames, curbs, buildings and others.

D. Walks shall be hand-floated and broom-finished, edged and grooved at construction joints and at intermediate intervals matching those intervals of the walk being replaced.

1. The intermediate grooves shall be scored a minimum of 1/4 of the depth of the walk.

2. The lengths of blocks formed by the grooving tool, and distances between construction and expansion joints shall be uniform throughout the length of the walk in any one location.

E. The minimum length of curb or gutter to be left in place or replaced shall be 5 feet. Where a full section is not being replaced, the existing curb or gutter shall be saw cut to provide a true edge.

1. The restored curb or gutter shall be the same shape, thickness and finish as being replaced and shall be built of the same concrete and have construction and expansion joints as stated above for sidewalks.

F. All concrete shall be placed and cured as specified in the Section for concrete.

3.09 LAWNS AND IMPROVED AREAS

A. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified, below the proposed finished surface.

1. If the depth of existing topsoil prior to construction was greater than 4 inches, topsoil shall be replaced to that depth.

B. The furnishing and placing of topsoil, seed and mulch shall be in accordance with the Section entitled "Topsoil and Seeding".

C. When required to obtain germination, the seeded areas shall be watered in such a manner as to prevent washing out of the seed.

D. Any washout or damage which occurs shall be regraded and reseeded until a good sod is established.

E. The Contractor shall maintain the newly seeded areas, including regrading, reseeding, watering and mowing, in good condition.

3.10 CULTIVATED AREA REPLACEMENT

A. Areas of cultivated lands shall be graded to a depth to receive topsoil of not less than the depth of the topsoil before being disturbed. All debris and inorganic material shall be removed prior to the placing of the topsoil.

B. The furnishing and placing of topsoil shall be in accordance with the Section entitled "Topsoil and Seeding".

C. After the topsoil has been placed and graded, the entire area disturbed during construction shall be cultivated to a minimum depth of 12-inches with normal farm equipment.

1. Any debris or inorganic materials appearing shall be removed.

2. The removal of stones shall be governed by the adjacent undisturbed cultivated area.

D. Grass areas shall be reseeded using a mixture equal to that of the area before being disturbed, unless otherwise specified.

3.11 OTHER TYPES OF RESTORATION

A. Trees, shrubs and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and size.

1. All planting and care thereof shall meet the standards of the American Association of Nurserymen.

B. Water courses shall be reshaped to the original grade and cross-section and all debris removed. Where required to prevent erosion, the bottom and sides of the water course shall be protected.

C. Culverts destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location and grade. When there is minor damage to a culvert and with the consent of the Engineer, a repair may be undertaken, if satisfactory results can be obtained.

D. Should brick pavements be encountered in the work, the restoration shall be as set forth in the Special Provisions or as directed.

3.12 MAINTENANCE

A. The finished products of restoration shall be maintained in an acceptable condition for and during a period of one year following the date of Substantial Completion or other such date as set forth elsewhere in the Contract Documents.

-END OF SECTION-

SECTION 02600

PIPE, FITTINGS AND INSTALLATION

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, equipment and incidentals necessary to install and test pipe and fittings as shown on the Drawings and required by the Specifications.

B. Piping shall be located substantially as shown. The Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference between pipes or for other reasons.

C. Wherever the word pipe or piping is used it shall mean pipe and fittings unless otherwise noted. All ductile iron pipe (D.I.P.), fittings, glands and accessories shall be of the same manufacturer unless approved otherwise.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE (D.I.P.) AND FITTINGS

A. Ductile iron pipe (D.I.P.) shall conform to ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 Standard. The pipe shall conform to thickness class 350 unless noted otherwise. All pipe, fittings and joints should be capable of accommodating pressure up to 350 psi. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

B. Ductile iron mechanical joint fittings shall have a body thickness and radii of curvature conforming to ANSI A21.10 and have joints in accordance with ANSI/AWWA C111.A21.11. Fittings and joints shall be supplied with all accessories.

C. All pipe and fittings shall be tar coated outside and shall receive a standard cement lining with bituminous seal coat on the inside in accordance with ASA Specification A21.40 (AWWA-C104).

D. Cement mortar lining and seal coating for pipe and fittings, where applicable, shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.

E. All ductile fittings shall be rated at 350 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 80-60-03 per ASTM Specification A339-55.

F. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.

G. Push-on type joints shall be single rubber gasket, with cast gasket socket and recessed bell with a tapered annular opening and flared socket and shall conform to ANSI/AWWA C111/A21.11. Plain spigot ends shall be suitably beveled to permit easy entry into the bell, centering and compressing the gasket.

H. Ductile iron flanged joint pipe shall conform to ANSI/AWWA C115/A 21.15 Standard and have a Class of 350. The pipe shall have a rated working pressure of 350 psi with Class 125 flanges. Gaskets shall be ring gaskets with a thickness of 1/8-inch. Flange bolts shall conform to ANSI B16.1.

I. Flanged fittings shall meet all requirements of ANSI/AWWA C110/A21.10 and have Class 125 flanges. Fittings shall accommodate a working pressure up to 350 psi and be supplied with all accessories.

2.02 POLYVINYL CHLORIDE (PVC) PIPE (SDR 21 AND SDR 17)

A. Polyvinyl chloride (PVC) pipe for water mains shall be Class 200 (SDR 21) or Class 250 (SDR 17) PVC pressure rated pipe as shown on the Drawings or indicated in the proposal form with either twin gasket joints or integral bell joints with rubber O-ring seals.

B. All PVC pipe shall conform to the latest revisions of ASTM D-1784 (PVC Compounds), ASTM D-2241 (PVC Plastic Pipe, SDR) and ASTM D-2672 (Bell-End PVC Pipe). Rubber gasketed joints shall conform to ASTM D-3139. The gaskets for the PVC pipe joint shall conform to ASTM F-477 and D-1869.

C. Couplings shall be furnished by the pipe manufacturer and shall accommodate the pipe for which they are used. Rubber gasket joints shall provide adequate expansion to allow for a 50 degree change in temperature on one length of pipe. Lubrication for rubber connected couplings shall be water soluble, non-toxic, be non-objectionable in taste and odor and have no deteriorating affect on the PVC or rubber gaskets and shall be as supplied by the pipe manufacturer. Couplings shall conform to ASTM D-3139; SDR-21, 200 psi.

D. All pipe and couplings shall bear identification markings that will remain legible during normal handling, storage and installation, which have been applied in a manner that will not reduce the strength of the pipe or coupling or otherwise damage them. Pipe and coupling markings shall include the normal size and OD base, material code designation, dimension ratio number, ASTM Pressure Class, ASTM designation number for this standard, manufacturer's name or trademark, seal (mark) of the testing agency that verified the suitability of the pipe material for potable-water service. Each marking shall be applied at intervals of not more than 5 feet for the pipe and shall be marked on each coupling.

2.03 POLYVINYL CHLORINE (PVC) PIPE - C.I. PIPE SIZE DR14 AND DR 18

A. Pipe shall meet the requirements of AWWA C-900 Polyvinyl Chlorine (PVC) Pressure Pipe. All Class 200 pipe shall meet the requirements of DR 14 and all Class 150 pipe shall meet the requirements of DR 18. Joints shall be integral bell or twin gasket joints with rubber O-ring seals.

B. All pipe shall be suitable for use as a pressure conduit. Provisions must be made for expansion and contractions at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a solid cross-section elastomeric ring which meets the requirements of ASTM D-1869 and F-477. The bell section shall be designed to be at least as strong as the pipe wall. Sizes and dimensions shall be as shown in this specification.

C. Gaskets and lubricants intended for use with PVC pipe and couplings shall be made from materials that are compatible with the plastic material and with each other when used together, will not support the growth of bacteria, and will not adversely affect the potable qualities of the water that is to be transported. Gaskets and lubricants shall be supplied by the pipe manufacturer.

D. Physical Requirements:

1. Standard Laying Lengths - Standard laying lengths shall be 20 ft. (plus or minus 1") for all sizes. The total footage of pipe of any class and size shall be furnished in standard lengths. Each length of pipe shall be tested to four times the class pressure of the pipe for minimum of 5 second. The integral bell shall be tested with the pipe.

2. Pipe Stiffness - The pipe stiffness using F/y for PVC class water pipe shall be as follows:

Class	DR	F/y
200	14	815
150	18	364

3. Quick Burst Test - Randomly selected tested in accordance with ASTM D-1599 shall withstand without failure pressures listed below when applied in 60 - 70 seconds. Class 150 shall have a minimum burst pressure of 755 psi and Class 200 shall have a minimum burst pressure of 986 psi at 73 degrees F. for all sizes.

4. Drop Impact Test - Pipe shall withstand without failure at 73 degrees F. an impact of 120 ft/lbs created by a falling 12 lb missile with a 2" radius nose without visible evidence of shattering or splitting.

E. All pipe and couplings shall bear identification markings that will remain legible during normal handling, storage and installation, which have been applied in a manner that will not reduce the strength of the pipe or coupling or otherwise damage them. Pipe and coupling markings shall include the nominal size and OD base, material code designation, dimension ratio number, AWWA Pressure Class, AWWA designation number for this standard, manufacturer's name or trademark, seal (mark) of the testing agency that verified the suitability of the pipe material for potable-water service. Each marking shall be applied at intervals of not more than 5 feet for the pipe and shall be marked on each coupling.

2.04 DUCTILE IRON MECHANICAL JOINT FITTINGS FOR PVC PIPE

A. General: Cast-iron mechanical joints shall conform to the latest revision of ANSI A21.11 for centrifugally cast-iron water pipe.

1. 3" to 12". All Working Pressures: Fittings shall conform to ASA Specification A21.10 for 250 psi water working pressure plus water hammer.

2. Fittings 12" and Over, for 150 psi and Less WWP: Fittings for use on 150 psi WWP pipe shall be AWWA Class D Pattern.

3. Fittings 12" and Larger, for 200 psi and Above WWP: Fittings shall be ductile iron or gray iron rated at 250 psi water working pressure plus water hammer. Ductile iron fittings only will be used with ductile iron pipe.

B. All ductile iron fittings shall be rated at 250 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grad 80-60-03 per ASTM Specification A33955. All fittings for connection to PVC pipe-all classes, shall be ductile iron.

C. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.

D. Lining and Coating: All mechanical joint fittings shall be cement lined and bituminous seal coated per Federal Specification WW-P-42lb and ASA Specification A421.40 (AWWA C104). Bituminous outside coating shall be in accordance with ANSI/AWWA C110/A21.10.

PART 3 - EXECUTION

3.01 LAYING DEPTHS FOR WATER MAINS

In general, water mains shall be laid with a minimum cover of 36" above the top of the main, unless otherwise noted on the Drawings , i.e. for minimum separation between water main and other utilities, connections to existing mains, valve locations, or when required by Kentucky Department of Highways, i.e. ditch lines and borings shall be 42" minimum cover.

3.02 PIPE BEDDING

A. The foundation for pipes laid in trenches shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. Pipe bells shall not carry any of the load of the backfill.

B. The Contractor shall use the "Undercutting Method" of pipe bedding.

C. When the "Undercutting Method" is used in rock bottom trenches, Class I granular bedding (No.9 crushed stone aggregate) or earth shall be of such depth that the bottom of the barrel of the pipe will be at least 6" above the bottom of the trench as excavated. Pipe bedding required in this paragraph is NOT considered a separate pay item.

D. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of line or grade, the pipe must be weighted or secured permanently in place by such means as will prove effective. In areas where a high water table exists, the Contractor is cautioned to exercise extreme care in the placement of the backfill material to prevent flotation of the pipe at any time.

E. Where an unstable (i.e., water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate. The depth of the foundations dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required Class I bedding can be placed. The amount of crushed stone aggregate required to bring the top of the foundation to the trench bottom prior to the removal of the unstable material will be considered a separate pay item following negotiation between the Contractor and Owner and constitute a change order item. No compensation will be made if the instability of the trench bottom is caused by the Contractor's neglect.

F. The Contractor shall use compacted earth material or Class I granular bedding (No.9 crushed stone aggregate) when the pipe is to be placed in the rock bottom trenches or in trenches with excavated rock present. This type of bedding material shall be placed 12" above and 6" below the pipe as shown on the Contract Drawings as "Class C Bedding Detail".

G. It should be noted that no pipe shall be laid on solid or blasted rock. No rock shall be allowed to rest against the pipe once it is placed in the trench.

H. Pipe bedding as required in Paragraphs C and D of this Article is NOT considered a separate pay item.

3.03 PIPE LAYING

A. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the Plans. Pipe shall be fitted and matched so that when laid in the work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out hereinbefore under "Pipe Bedding" and in no case shall the supporting of pipe on blocks be permitted.

B. Fittings and specials for the water main shall be provided and laid as and where directed by the Engineer or as shown on the Plans.

C. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure its being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles tot he longitudinal axis of the pipe.

D. The interior of the pipe, as the work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is topped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted into the pipe bell so as to exclude earth or other material and precautions shall be taken to prevent flotation of pipe by runoff into trench.

E. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has had an opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.

F. Anchorage of Bends, Tees, Plugs and Valves:

1. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by using suitable harness, thrust blocks or ballast. Valves shall be provided with similar protection. Thrust blocks and supports shall be as shown in the typical details, with sufficient volumes of concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that the pipe and fitting joints will be accessible for repair. Thrust blocks shall bear on undisturbed earth or rock.

2. Bridles, harness or pipe ballasting shall meet with the approval of the Engineer. Steel rods and clamps shall be galvanized.

3. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances; such items shall be included in the unit price bid for the supported item.

3.04 WATER MAINS PUSHED UNDER DRIVEWAYS

The Contractor may be required to tunnel or bore under a bituminous or concrete surface driveway instead of open trenching as requested by the property owner. The opening under the driveway shall be of the smallest diameter possible to accommodate the water main to minimize settlement of the driveway. Should settlement occur, the Contractor shall repair the driveway at his own expense in a manner satisfactory to the Engineer and the property owner.

3.05 JOINTING

Jointing shall be accomplished in accordance with the manufacturer's recommendation.

3.06 TYPES OF CRUSHED STONE MATERIAL

Two classes of crushed stone material are mentioned in the Detailed Specifications. The Type of material used in each class is as follows:

Class I No. 9 Aggregate
Class II Dense Graded Aggregate

3.07 BACKFILLING

A. Initial Backfill:

1. This backfill is defined as that material which is placed over the water main from the spring line in an earth trench to a point 6" above the top of the pipe or from the trench bottom in a rock trench to a point 12" above the top of the pipe. The initial backfill for Case I situations shall be earth material free of rocks, acceptable to the Engineer or Class I material (No. 9 crushed stone aggregate). The initial backfill for Case II, Case III and Case IV situations shall be compacted earth material or be Class I material (No.9 crushed stone aggregate).

2. In areas where large quantities of rock are excavated, and the excavated earth is insufficient, then the Contractor must either haul in earth or order crushed stone aggregate for backfilling over the top of the pipe. Neither earth nor the crushed stone aggregate used to fulfill the backfill requirements is considered a pay item.

B. Final Backfill: There are four cases where the method final backfilling varies. The various cases and their trench situations are as follows:

1. Case I: Areas not subject to vehicular traffic.

2. Case II: Gravel areas subject to light vehicular traffic such as residential driveways; church and commercial parking lots and entrances; and farm drives.

3. Case III: City and County gravel roads; gravel and bituminous road shoulders; all bituminous surface areas such as City and County streets, residential driveways, church and commercial parking lots, and entrances; City and County road shoulders.

4. Case IV: State maintained streets and roads; road shoulders for State roads and streets.

C. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point twelve (12) inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:

1. Case I - The trench shall be backfilled from a point 6" (12" for a rock trench) above the top of the pipe to a point 8" below the surface of the ground with earth material free from large rock (over one-half cubic foot in volume), acceptable to the Engineer. The remainder of the trench to existing grade shall be backfilled with earth material reasonably free of any rocks.

   Earth backfill used in this Case is not a separate pay item but will be paid under the pay item "Water Main".

2. Case II - The trench shall be backfilled from a point 6" (12" for a rock trench) above the top of the pipe to a point 12" below the surface of the ground with Class I (No. 9 crushed stone aggregate) material. The trench shall be tamped to assure maximum possible

compaction (approximately 80 to 85 percent of Standard Proctor density). Extreme care shall be exercised to prevent damage to the pipe during tamping operation. The remainder of the trench to existing grade shall be backfilled with Class II (dense graded aggregate) material with the material being mounded over the trench. The trench shall be tamped again to assure additional compaction. The trench may be left with a slight mound if permitted by the Engineer.

Class I material used and method of backfilling used in this case is not a separate pay item and is considered incidental to the work and will be paid for under the item "Water Main".

Class II material used in this method of backfill is not a separate pay item and will be included in the unit price per linear foot under the item "Water Main".

Sufficient stockpiles of Class II material shall be placed throughout the project area to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling of settled areas by the Contractor.

3. Case III - The trench shall be backfilled from a point 6" (12" for a rock trench) above the top of pipe to the height indicated in the "City and County Maintained Streets, Roads and Driveway Pavement Replacement" detail with Class I (No. 9 crushed stone aggregate) material. Said material shall be tamped as described for Case II. A 12-inch layer of Class II (dense graded aggregate) material shall be placed over the compacted backfill before bituminous or concrete surface is placed as shown in the previously mentioned details. The 12-inch layer of Class II material is NOT a separate pay item but such expense will be borne by the Contractor and is considered incidental to the bid items "Bituminous Surface Replacement" and "Concrete Surface Replacement". Also considered incidental is all temporary stone required for a temporary surface between backfilling and pavement replacement.

   Sufficient stockpiles of Class II material shall be placed throughout the project area to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled areas by the Contractor. Class II material used in this method of backfill is paid for as a support item under item "Bituminous Surface Replacement" or "Concrete Surface Replacement" as its unit price per linear foot.

   Class I material used for backfilling is not a separate pay item and is considered incidental to the bid item "Water Main".

4. Case IV - The trench shall be backfilled from the spring line to a point one 12-inches above the top of the pipe with earth material free from rock and acceptable to the Engineer, it shall be carefully and solidly tamped by approved mechanical methods. The remainder of the trench shall be backfilled to the height indicated in the "State Maintained Streets and Roads Pavement Replacement Detail" in the Contract Drawings, with material free from rock and acceptable tot he Engineer; said material shall be mechanically tamped in approximately six-inch layers to obtain the maximum possible compaction. The backfilling method is NOT a separate pay item. A 12-inch layer of dense graded aggregate shall be placed over the compacted earth backfill when a bituminous or concrete surface street or road has been trenched. The 12-inch layer of stone is not a separate pay item but such expense will be borne by the Contractor.

D. Excavated materials from trenches and tunnels, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. The Contractor may contact the Owner regarding the location of a suitable disposal site; however, if the Owner cannot recommend a site, it shall be the responsibility of the Contractor to obtain locations or permits for the disposal of the waste material. Unit prices for the various pipe sizes shall

include the cost of disposing of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

3.08 CRUSHED STONE BACKFILL

A. The Class I granular material used in Case II and Case III backfill situations shall be No. 9 Crushed Stone aggregate (No.9 Stone). Granular material will not be paid for as a separate bid item.

B. The twelve inches 12-inch of crushed stone backfill that is required in "City and County Maintained Streets, Roads and Driveway Pavement Replacement" or "State Maintained Streets and Roads Pavement Replacement" will not be paid for under the provisions of this article.

3.09 BITUMINOUS PAVEMENT REPLACEMENT

A. Sections of pavement shall be replaced as required to install the pipelines under the work of this Section. Disturbed pavement shall be reconstructed to original lines and grades with bituminous binder as detailed on the Drawings and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to these operations.

B. Prior to trenching, the pavement shall be scored or cut to straight edges along each side of the proposed trench to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be recut and trimmed as necessary to square, straight edges after the pipe has been installed and prior to placement of the binder course.

C. Backfilling of trenches shall be in accordance with the applicable portions of this section.

D. Bituminous concrete binder shall be one course construction in accordance with applicable provisions of the Kentucky Department of Highways Standard Specifications, Section 402. Placement and compaction of binder course shall be in accordance with Section 402 of the Kentucky Department of Highways Standard Specifications. Minimum thickness after compaction shall be as shown on the Drawings.

E. Bituminous pavement replacement will not be paid for as a separate bid item.

3.10 CRUSHED STONE SURFACE REPLACEMENT

The Class II granular material used in Case II backfill situations shall be dense graded aggregate (D.G.A.). Granular material will be included in the unit price per linear foot for "Water Mains".

3.11 CONCRETE SEPARATOR FOR UTILITY CROSSING OR CASING PIPE WATER/SAN. SEWER CROSSING

A. At locations shown on the Contract Drawings, or as required by the Specifications and Contract Drawings, concrete separator shall be used when the clearance between the proposed water main and any existing non-contaminating utility pipe is one (1) foot or less. Utility pipe includes underground gas, telephone and electrical conduit, storm sewers, or any other underground utility pipe.

B. There are two cases of non-contaminating utility crossing encasement. Case I is applicable when the proposed water main is <u>below</u> the existing utility line. Case II is applicable when the proposed water main is laid <u>above</u> the utility line. In either case, the concrete shall extend to at least the spring line of each pipe involved.

C. When a water main crosses an existing sanitary sewer line, either above or below and less than two feet vertical or ten feet horizontal separation, the water main shall be encased as shown on the Standard Details, or as required by the Specifications and Contract Documents.

D. Concrete shall be Class B (2500 psi) and shall be mixed sufficiently wet to permit it to flow between the pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade of line of either pipe or damage the joints.

3.12 CONCRETE FOR CREEK CROSSING (Polyethelene and Type C Creek Crossing)

A. At locations shown on the Contract Drawings, or as required by the Specifications and Contract Drawings, concrete encasement shall be used when the water main crosses a stream or creek which is in rock or as directed by the Engineer.

B. All creek crossings (Polyethelene and Type C) shall be constructed as per the detail shown on the Contract Drawings.

C. Concrete shall be Class B (3000 psi) and shall be mixed sufficiently wet to permit flow around the pipe and to form a continuous bed. In tamping the concrete, care shall be taken not to disturb the grade or line of the pipe or injure the joints. Concrete shall be protected from excess water.

D. Concrete placed outside the specified limits or without authorization from the Engineer will not be subject to payment. Concrete will be paid under the pay items "Polyethelene and Creek Crossing Type C.

3.13 TESTING OF WATER MAINS

The completed work shall comply with the provisions listed below, or similar requirements which will insure equal or better results:

A. Before any allowable leakage calculation are performed the pipeline being tested must pass the hydrostatically test.

B. The pipe shall be hydrostatically tested at 1.5 times the design pressure at the point of testing. The duration of the test(s) shall be at least 2 hours during which time the pressure shall not fall more than 5 psi. The pipe shall be tested for allowable leakage according to AWWA C-600 (latest revision) concurrently with the pressure test.

C. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 3000 feet. Testing shall proceed from the source of water toward the termination of the line. The line shall be tested upon the completion of the first 3000 feet. After the completion of two consecutive tests without failure, the Contractor, at his option and with the Engineer's approval, may discontinue testing until the system is complete.

D. Duration of test shall be not less than 2 hours.

E. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with.

F. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.

G. Test pressures shall not be less than 1.5 times the working pressure at the highest point along the test section, not exceed pipe or thrust restraint design pressure, not vary more than $\pm$ 5 psi and not exceed twice the rated pressure of the valves when the pressure boundary of the test sections include closed gate valves.

H. Before applying the specified test pressure, air shall be expelled completely from the pipes and valves. If permanent air vents are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water.

3.14 LEAKAGE TEST

A. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

B. The allowable leakage shall not be greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133{,}200}$$

Where L is the allowable leakage in gallons per hour; S is the length of the pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gage.

C. All visible leaks are to be repaired regardless of the amount of leakage.

3.15 DISINFECTION OF WATER LINES

A. New potable water lines shall not be placed into service, either temporarily or permanently, until they have been thoroughly disinfected in accordance with the following requirements and to the satisfaction of the OWNER.

B. After pressure testing, a solution of hypochlorite using HTH or equal shall be introduced into the section of the line being disinfected sufficient to insure a chlorine dosage of at least 50 parts per million (PPM) in the water main. While the solution is being applied, the water should be allowed to escape at the ends of the line until tests indicate that a chlorine concentration of at least 50 PPM has been obtained throughout the pipe. Open and close all valves and cocks while chlorinating agent is in the piping system. The chlorinated water shall remain in the pipe for 24 hours. Disinfection shall be repeated until a minimum chlorine residual of 25 PPM is measured after 24 hours. Once a chlorine residual of 25 PPM is obtained after 24 hours, the water main shall be thoroughly flushed until the residual chlorine content is not greater than 1.0 PPM.

C. Following disinfection of the line, bacteriological samples shall be collected and analyzed in accordance with the requirements of Kentucky Department of Natural Resources and Environmental Protection. When the samples have been tested and reported safe from contamination, the water line may be connected to the system. The Contractor shall provide to OWNER written documentation that the water sample passed the bacteriological test and is safe.

D. All sampling shall be taken in the presence of the Engineer or his representative.

E. The contractor shall compensate the owner for all water used in flushing, testing and sterilization.

3.16 PLACEMENT OF TRACING WIRE

Detectable underground copper tracing wire shall be installed with all utility lines. Insulated copper trace wire shall be attached to the top of the pipe with adhesive tape or other suitable devices. At each hydrant, valve, and end of new pipe installation, the trace wire shall be daylighted and the ends connected together with split bolt connectors covered with waterproof tape or wrap. For long runs of pipe, the maximum unbroken length of the trace wire shall be 2500 feet. Underground splicing shall be made using brass split bolt electrical connectors. The trace wire shall be #12 AWG THWN copper.

3.17 PLACEMENT OF IDENTIFICATION TAPE

A. The placement of detectable underground marking tape shall be installed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

B. The identification tape shall bear the printed identification of the utility line below it, such as "CAUTION - BURIED WATER LINE BELOW". Tape shall be reverse printed, surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be two (2) inches in width. Colors are: yellow - gas, green - sewer, red - electric, blue - water, orange - telephone, brown - force main.

C. The tape shall be the last equipment installed in the ditch so as to be first out. The tape shall be buried 4 - 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to the Owner or his agent or Engineer.

3.18 CLEAN-UP

Upon completion of the installation of the piping and appurtenances, the Contractor shall remove all debris and surplus construction materials resulting from the work. The Contractor shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line.

3.19 CONNECTING TO THE WATER SYSTEM

Unless otherwise directed by the OWNER, the CONTRACTOR shall connect the new water main to the existing water system. The CONTRACTOR shall notify the OWNER when the connection is to be made so that representatives of the OWNER may operate existing valves and witness the connection. A minimum notice of at least 24 hours in advance of the connection shall be given to the UTILITY. The Contractor shall coordinate all connections and other work which require disruption of water service so as to minimize the amount of time the affected water lines are out of service.

- END OF SECTION -

SECTION 02626

CUSTOMER METER SERVICE AND SERVICE TUBING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes service pipelines constructed of CTS polyethelene tubing as shown on the Contract Drawings, complete with fittings and accessories.

B. Certain features of the CTS tubing shall be as scheduled.

C. The Contractor shall furnish all labor, tools, equipment, and materials necessary to complete the meter service connections as shown on the Contract Drawings and herein specified.

1.02 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)
2. American Water Works Association (AWWA)

1.03 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Manufacturer's certification that all materials furnished are in compliance with the applicable requirements of the referenced standards and this specification.

2. Layout drawings showing the location of copper tube including details of the support system, sleeves, unions and appurtenances.

PART 2 PRODUCTS

2.01 SERVICE CLAMPS

All service connections of all sizes shall be made through the use of service clamps or saddles. Service saddles shall have ductile iron body, double strapped with O-ring resilient gasket, suitable for use on ductile iron pipe or PVC pipe, and tapped with same threads as the corporation stops. Saddles for all mains shall be double strap type saddles and have a maximum working pressure of 350 psi *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.02 CORPORATION STOPS

Corporation stops for use in service clamps shall be equal for 3/4", 1" and 2" service tubing and have a maximum working pressure of 350 psi. Corporation stops shall have iron pipe threads with compression coupling connection for copper tubing outlets. A rigid stainless steel insert stiffener shall be used inside the PE tubing, when encountered. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.03 SERVICE TUBING 3/4", 1" AND 2" POLYETHYLENE TUBING (CTS SERVICE TUBING)

A. Pipe shall be made from virgin, ultra-high molecular weight polyethylene resin meeting the requirements of Type III, Class C, Category P34 polyethylene as defined by ASTM D-1248, latest revision, "Polyethylene Plastics Molding and Extrusion Materials". **All service tubing for Bracken County Water District shall be 3/4" unless otherwise noted.**

B. Dimensions and tolerances shall meet the values as listed in AWWA C-901, latest revision, "Polyethylene (PE) Pressure Pipe Tubing and Fittings". Standard dimension ratio shall be DR-7.3 (OD base), Pressure Class 200 psi.

C. Pipe shall be rated for use with water at 73.4 degrees F. at a hydrostatic design stress of 630 psi and a maximum working pressure of 200 psi. The pipe shall sustain a water pressure as defined in ASTM D 1598 for 1000 hours with water at 73.4 degrees F.

D. Surface shall be homogeneous inside and out and completely free of irregularity. Random testing shall be performed at intervals during all production runs to assure uniformity in all respects. The tubing shall carry the National Sanitation Foundation seal of approval for drinking water.

E. Pipe shall be marked in lettering at intervals of not more than five (5) feet and such marking shall include nominal size; manufacturer's name or trademark; pressure rating for water at 73.4 degrees F., 200 psi; applicable ASTM specification,; ASTM material specification, PE 3406; standard dimension ratio, DR-7.3; the National Sanitation Foundation Seal of Approval (NSF mark) and production code.

F. Pipe shall be guaranteed in writing against rot, corrosion and defects for 50 years from date of installation, with pipe replacement and labor cost warranted in writing for 25 years from date of installation.

2.04 COPPER SERVICE TUBING (not in this contract)

A. Buried, Exterior - Copper Pipe: Type K hard drawn copper per ASTM B-88. Fittings: Wrought copper or cast brass. Joints: Lead free, tin-silver solder.

B. Buried, Below Slab: Copper Pipe, 2" and Smaller: Type K soft drawn copper per ASTM B-88. Fittings and joints shall not be permitted below slab.

C. Buried: Copper Pipe, 2" and Smaller: Type K soft drawn copper per ASTM B-88. Fittings and joints shall not be permitted in the service tubing.

D. All solder joints shall be soldered with an approved, lead free tin-silver solder. Acid core solder shall not be used.

E. Copper tube shall be as specified herein unless otherwise shown on the Contract Drawings or in the pipe schedule.

F. Copper tube shall conform to the following standards:

	ASTM
Seamless Copper Water Tube	B88
Copper Drainage Tube (DWV)	B306
Seamless Copper Tube, Bright Annealed	B68

1. Seamless copper water tube shall be used for hot and cold water and compressed air.

   a. Type K where installed in concrete, underground or when immersed in liquids.

   b. Type L where exposed and in concealed locations inside structures.

   c. Soft temper when installed in concrete or underground.

   d. Hard temper when installed in exposed and concealed locations.

2. Copper drainage tube will be permitted only for sanitary waste, drain and vent piping above ground and inside structures.

3. Bright annealed seamless copper tube shall be used for liquid fuel and refrigerant and all small (3/8 inch and smaller) tubing unless otherwise specified.

G. Wall thickness shall be at least equal to Type K seamless copper water tube unless heavier walls are specified.

2.05 METER SETTING EQUIPMENT

A. Meters shall be placed inside meter boxes using coppersetters with 3/4" or 1" saddle nut connection for the meter. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE. All coppersetters shall have a ball angle meter valve (lockable) stop at the meter inlet and dual check valve on the outlet. coppersetters shall be 12 inches in height with connections for the appropriate service tubing and have a maximum working pressure of 300 psi. .

B. For larger meters (1-1/2" and 2") the meters shall be installed with ball meter valves on inlet side and the meter outlet side. Meters shall be placed on concrete block or equivalent support inside the meter box.

C. For individual meter with pressure reducing valves or more than one meter the coppersetters shall be the Tandem type coppersetters as manufactured by Ford, Mueller or Engineer approved equal and 12 inches in height and placed in meter boxes with 18" I.D.

E. A rigid stainless steel insert stiffener shall be used inside the PE tubing at all connections to the coppersetters.

2.06 SERVICE METERS (Not in Contract)

The service meter main body shall be of high grade bronze, with hinges, single lid cover and raised characters cast on the body indicating the direction of flow. Meter shall have a working pressure rating of

150 psi. The register shall be straight reading gallon type. The register unit shall be hermetically sealed, and driven by permanent magnets. The register shall have a center sweep hand and a test circle shall be divided into 100 equal parts and include a flow finder. The register shall carry a minimum 10-year warranty.

The meters shall be manufactured by _____. The entire unit is to be pre-assembled in a workmanlike manner with all components fitted snugly into the box and fastened to prevent movement. All joints shall be sealed with Teflon tape. The inlet and outlet is to be equipped with compression couplings.

2.08 METER BOXES

Meter boxes shall be plastic or "Ultra-Rib" circular with dimension as shown on the Drawings. The meter box cover where installation is to be in roadways or sidewalks and shall have heavy duty lid for light vehicular traffic. The meter box where installation is to be roadways or sidewalks shall be of concrete construction for vehicular traffic. The meter box, cover and meter setting shall be constructed as shown on the drawings or as directed by the Owner or Engineer. *SEE SECTION 01600 MATERIAL AND EQUIPMENT for* APPROVED MANUFACTURE.

2.08 ACCESSORIES

A. Fittings and Couplings

1. Fittings for copper tube shall be wrought copper or cast bronze for soldered joints and brass for flared joints.

2. Flexible couplings as shown or required for copper tube shall be flexible metal hose couplings.

B. Joints

1. Joints for seamless copper water tube to be installed in concrete and underground shall be flared type and shall have threads in accordance with AWWA C 800.

2. Joints for seamless copper water tube and copper drainage tube installed exposed and inside structures shall be soldered.

   a. Solder and flux used in joints of water lines, shall contain no more than 0.2% lead.

   b. Solder shall be Tin-Silver or approved equal.

   c. Solder flux shall be as recommended by the solder manufacturer.

3. Joints for bright annealed seamless copper tube used in liquid fuel lines shall have flared joints, approved by Underwriter's Laboratories.

4. Joints for small tubing (3/8 inch and smaller) shall be of the locking type compression fittings or soldered as shown in the piping schedule and as directed.

PART 3 - EXECUTION

3.01 INSTALLATION OF METER SERVICES

All customer meter services shall be reconnected at the closest distance from the existing service line. All locations of the meters shown on the plans are approximate locations. The Owner reserves the right to change the location of the connections from the existing line to the new main.

3.02 INSTALLATION OF SERVICE TUBING

A. All service tubing installed beneath bituminous or concrete roads shall be jacked under the roads. When State maintained roads are being jacked and rock is encountered, permission to open cut the road shall be obtained by the Contractor from the Department of Transportation's District Permit Engineer. If permission is refused, the Contractor shall attempt to jack at another location and shall continue to do so until a successful crossing is obtained.

B. Minimum cover for all service lines shall be 36 inches (at all locations) when within the proposed and existing highway right-of-way and construction easements. Additional cover may be required at proposed drainage ditch, storm sewer, or other noted locations.

3.03 BACKFILLING SERVICE TUBING

When service tubing is laid in an open cut across a road of any type surface (crushed stone, bituminous or concrete), the backfill shall consist of Class II granular material (dense graded aggregate) and shall be placed full depth. Payment for Class II material used will not be paid as a separate pay item, but will be included in the price for installing the service tubing.

3.04 INSTALLATION OF COPPER TUBING (not in contract)

A. Install copper tubing, fittings, specials, and accessories in accordance with the applicable configuration shown on the Contract Drawings and the provisions of the Sections entitled "Trenching, Backfilling and Compacting" and "Pipeline Installation".

B. Exposed copper tube shall be carefully erected and neatly arranged.

1. Copper tube shall be run parallel with walls inside structures and shall be pitched to drain.

2. Drain valves shall be installed at the low points of liquid filled systems.

3. Valved fill connections shall be provided for closed systems.

C. Copper tube installed for a compressed air or gas system shall be pitched in the direction of flow.

1. Connections shall be at the top of the main.

2. Low points of the system shall have drip pipes not less than 12 inches long and drain pet-cocks unless automatic moisture traps are shown.

D. Unions shall be provided on copper tube systems with soldered joints.

1. Unions shall be located at control valves, solenoid valves, moisture and steam traps, other items of connected equipment and as shown on Contract Drawings.

2. Unions shall be of cast bronze or brass construction.

3. Dielectric unions shall be used when connecting copper tube to ferrous metals.

E. Copper tubing shall be supported and anchored in place by the use of copper or brass units spaced not greater than 10 feet on center and each side of each change of direction.

3.05 FIELD TESTING AND CHLORINATION

A. Perform hydrostatic and leakage tests in accordance with the applicable provisions of the Section entitled "Leakage Tests", at the test pressure specified or scheduled.

B. Disinfect piping and appurtenances in accordance with the Section entitled "Chlorination", where specified or scheduled.

-END OF SECTION-

SECTION 02630

TAPPED CONNECTIONS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes tapping and installing of corporation stops and valves on existing or newly installed pipes without interruption of service, as shown on the Contract Drawings, complete with connections and accessories.

B. Installing of curb stops and boxes where specified or directed.

1.02 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Water Works Association (AWWA)

1.03 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Detail drawings for each size corporation stop, curb stop, tapping sleeve and valve, and service box.

PART 2 PRODUCTS

2.01 CORPORATION STOPS

A. Corporation stops shall be threaded to conform to AWWA C800 with standard corporation stop thread at the inlet. The outlet shall be fitted with coupling nut for flared tube service unless otherwise specified.

SEE SECTION 01600 MATERIAL AND EQUIPMENT for APPROVED MANUFACTURE.

2.02 CURB STOPS

A. Curb stops shall be threaded to conform to AWWA C 800 with coupling nuts for flared tube service.

1. ¾-inch shall be of the inverted new type.

2. 1-inch to 2-inch shall be of the plug-type with "O" ring seals to withstand a minimum working pressure of 175 psi.

3. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.03 SERVICE CLAMPS

A. Service clamps shall be designed for use on the type of pipe to which the connection is being made.

1. Ductile iron and asbestos-cement service clamps shall be the double strap type with neoprene gaskets.

2. Polyvinyl chloride pipe service clamps shall be of a full circle design with a minimum width of 2 inches.

3. Prestressed concrete pipe service clamps shall be made by or approved for use by the pipe manufacturer.

4. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.04 SERVICE BOXES

A. Service boxes shall be constructed of cast iron and sized for the curb stop upon which it is being installed.

1. Stationary shut-off rod shall be provided unless otherwise specified.

2. Boxes shall be telescopic with a minimum of 1-foot adjustment.

3. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.05 TAPPING SLEEVES AND VALVES (Not in Contract)

A. Tapping sleeves and valves shall be used for connections larger than 2 inches.

1. Tapping sleeves shall be designed and sized in accordance with the recommendations of the manufacturer.

2. Working pressure shall be 200 psi unless higher pressures are scheduled.

3. The seal of the tapping sleeve shall be mechanical joint or low lead 2.5% or less. Low lead as conforming to current regulations.

4. Valves for tapping sleeves shall be designed for the intended service and shall conform to the requirements of the Section entitled "Valves".

5. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install connections and accessories under the direction of personnel who have performed at least ten similar connections in accordance with the configuration shown on the Contract Drawings and the applicable provisions of the referenced Standards.

1. Threaded taps shall be made using a machine designed for cutting, threading and inserting the corporation without interruption of service.

a. Teflon tape may be used on corporation threads.

2. Tapping sleeve connections shall be made using a machine to cut and remove the segment through the valve without interruption of service.

B. Service boxes shall be set plumb and shall be independently supported on two bricks so no weight will be transmitted to the curb stop or carrier pipe.

C. Service clamps and tapping sleeves installed on prestressed concrete pipe shall be encased in a minimum of 2 inches of concrete mortar after installation.

-END OF SECTION-

SECTION 02640

VALVES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall furnish and install valves and miscellaneous piping appurtenances, as indicated on the Drawings and as herein specified.

B. The Drawings and Specifications direct attention to certain features of the equipment, but do not purport to cover all the details of their design. The equipment furnished shall be designed and constructed equal to the high quality equipment manufactured by such firms as are mentioned hereinafter, or as permitted by the Engineer. The Contractor shall furnish and install the equipment complete in all details and ready for operation.

C. Electrical work and equipment specified herein shall conform to the requirements of the applicable electrical sections.

D. Enclosures shall be of a suitable type for the atmospheres in which they are installed.

E. Sizes and capacities not specified herein are indicated on the Drawings.

F. Valves required within pre-engineered pump stations are not covered by this specification section.

PART 2 – PRODUCTS

2.01 BUTTERFLY VALVES (Not in Contract)

A. Butterfly valves and operators shall conform to the AWWA Standard Specifications for rubber seated butterfly valves, Designation C504, Class 150, except as hereinafter specified. Valves shall have a minimum 150 psi pressure rating.

B. All butterfly valves shall be of cast iron body per ASTM A-126, Class B. Valve discs shall be of ductile iron per ASTM A-536 and provide uninterrupted 360 degree seating edge. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Valve shafts shall be Type 304 stainless steel with V-type packing. O-ring seals are not acceptable.

C. Valve seats shall be full resilient seats of Buna - N or Hycar and retained in the body or on the disc edge. If the resilient seat is in the body, the disc shall conform to ASTM A-436 Type 1 (Ni-Resist) or gray/ductile iron with corrosion resistant seating surface. If the resilient seat is mounted on the disc edge, it shall be securely attached with Type 304 stainless steel retaining ring or pins. The disc seating edge shall be Type 316 stainless steel.

D. Valve operators shall be electric actuators as specified elsewhere in the specifications. The valve shaft and actuators shall be designed for both torsional and shearing stresses when the valve is operated under its greatest torque.

E. All valves shall conform with the latest revision of AWWA Standard for Butterfly Valves for Ordinary Water Service, AWWA C504. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.02 GATE VALVES AND BOXES

A. All gate valves shall be of the resilient seat wedge, iron body, non-rising stem, fully bronze mounted with O-ring seals. Valves shall be of standard manufacture and of the highest quality both as to materials and workmanship and shall conform to the latest revisions of AWWA Specification C-500. Valves shall have a rated working pressure of 250 psi.

B. Gate valves for buried service shall be furnished with mechanical joint end connections, unless otherwise shown on the plans or specified herein. The end connections shall be suitable to receive ductile iron or PVC pipe.

C. All gate valves shall have the name or monogram of the manufacturer, the year the valve casting was made, the size of the valve, and the working pressure cast on the body of the valve.

D. Buried service gate valves shall be provided with a 2" square operating nut and shall be opened by turning to the left (counterclockwise).

E. Buried service gate valves shall be installed in a vertical position with valve box as detailed on the plans. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.

F. Valve boxes shall be cast iron, two-piece, screw type (as shown on the drawings) with drop-cover marked "Water". They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street. A concrete pad shall be placed around the valve box cover as shown on the drawings. **This pad shall include valve box protector ring with copper locator pin.**

G. The Contractor shall furnish two (2) T-operating wrenches in the lengths necessary to operate the buried gate valves for an operator of average height in a normal working position.

H. Gate valves for installation in building, drywells, pits or vaults shall be flanged ANSI B16.1, Class 125 with handwheel operator, non-rising stem or OS&Y as indicated on the drawings.

I. Gate valves installed with tapping sleeves shall have a mechanical joint outlet and a flanged joint connection to the sleeves.

J. All valves shall conform with the latest revision of AWWA Standard for Gate Valves for Ordinary Water Works Service, AWWA C500. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

K. All 24" or larger gate valves shall be supplied with spur gearing and grease case.

L. All gate valves shall receive at two part thermosetting epoxy protective coating both inside and outside of the valve and shall be listed for use as with potable water by the Federal EPA. The epoxy coating shall meet or exceed ANSI/AWWA C550 Standard and ASTM D1763 Standard.

2.03 CONTROL VALVE (Not in Contract)

A. The control valve is an automatic pilot controlled, hydraulically operated, diaphragm actuated globe valve in the oblique (Y) pattern design. A 3-way solenoid pilot valve either applies upstream pressure to the upper control chamber to close the main valve or vents the upper control chamber to atmosphere allowing the main valve to open. The solenoid and a limit switch assembly on the main valve are electrically synchronized with the telemetry controls to allow the valve to open or close to fill the tank.

B. In the event of a power failure the valve will open immediately, regardless of the operational mode of the valve at the time of the power failure.

C. The main valve shall be a center guided diaphragm actuated globe valve of oblique (Y) pattern design. The body and cover shall be cast iron, ASTM A 126 Class B, with bronze seat. The internal and external surfaces of the valve body shall be fusion bonded coated. End connections shall meet the ANSI, or other internationally recognized standard required. The body shall have a replaceable non-threaded seat ring that is held in place by set screws which tighten into a body groove. This seat should be accessible and serviceable without removing the valve from the pipeline. The seat area shall have a flow opening with no stem guides, bearings or supporting ribs.

D. The actuator assembly shall be a double chamber design with a separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly consisting of the seal disk, valve shaft, bearing, diaphragm assembly, separating partition and top cover must be removable from the valve as a single unit. The control chamber between the diaphragm and the separating partition shall be capable of being open to or isolated from the valve internal body pressure. The stainless steel valve shaft shall be guided throughout its travel by a bearing in the separating partition. The replaceable resilient seal shall be rectangular in cross section and contained on three and one half sides. A lip shall be provided on the seal disk outside edge to lock the seal in place. The actuator assembly must be capable of accepting a V-port throttling plug by simply bolting the device to the seal disk.

E. The electric solenoid valve shall be a 3-way solenoid with a manual override system to allow the valve to be operated manually should electrical power be unavailable. The solenoid and limit switch shall be properly rated for the intended service. Liquid to the pilot must be filtered and a cock valve must be provided to isolate the control loop.

F. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

2.04 DUAL DISK VALVE (Not in Contract)

A. Dual Disc Check Valves shall be suitable for pressures up to 250 psig water service. The check valve shall be of the dual disc, wafer style with torsion spring induced closure. The valves shall be provided for installation between ANSI B16.1 Class 125 iron flanges.

B. The body shall be of one piece construction incorporating a vulcanized synthetic seal. Seal design must allow for positive seating at both high and low pressures. This shall be achieved by a minimal seal contact at low pressure with progressively increased contact at higher pressures. The disc shall fully overlap the synthetic seal, preventing pressure indentations. Opening and closing of the valve must utilize a lift and

pivot action to prevent seal wear and ensure long seal life. The stop and pivot pins shall be stabilized by the use of synthetic spheres to prevent wear due to vibration during operating conditions.

C. The valve body shall be constructed of ASTM A536 Grade 65-45-12 ductile iron. The disc shall be constructed of ASTM B584, Alloy C83600 (2"-12") cast bronze or ASTM B148, Alloy C95200 (14" and larger) cast aluminum bronze. The disc pins and stop pins shall be Type 316 stainless steel. The torsion spring shall be ASTM A313 Type 316 stainless steel up to 16 in. sizes and ASTM A313 Type 17- 7 PH on 18 in. and larger sizes. The seal shall be Buna - N per ASTM D2000-BG or Viton per D2000-CA.

D. End connections shall be full diameter threaded flanges.

E. The valves shall be hydrostatically tested at 1.5 times their rated cold working pressure. A seat closure test at the valve rating shall be conducted to demonstrate zero leakage. The manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

F. The exterior of the valve shall be coated with a universal alkyd primer.

G. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

2.05 CHECK VALVES (Not in Contract)

A. The check valves shall be a swing check valve with flanged ends; lever and weight and function to prevent reverse flow. The valve shall be tight seating when closed and full ported when open. The hinged shaft shall be completely out of the water way employing a disc with a convex shape facing the normal flow. The valve shall be manufactured where the closing of the valve will not cause water hammer and minimize disc slam. The valve shall be capable of a tight seal at pressures above 5 psi.

B. The valve body shall be cast iron with a bronze seat ring. The valve disc shall be cast iron and suspended from a non-corrosive shaft. Valves shall be rated at a minimum working pressure of 175 psi.

C. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

2.06 TAPPING VALVES AND SLEEVES (Not in Contract)

A. Tapping valves and sleeves shall be installed in the locations shown the Contract Drawings. The valves shall be a resilient seat wedge, iron body, non-rising stem, gate valve with a mechanical joint outlet and a flanged joint connection to the sleeves. They shall be provided with a valve box, counterclockwise opening and installed as described in detail on the plans.

B. Tapping Sleeves: Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable-iron, split-sleeve type with flanged outlet, and with bolts, follower rings and gaskets on each end of the sleeve or wrap/bolted stainless steel. Construction shall be suitable for a maximum working pressure of 200 psi. Bolts shall have hexagonal heads and nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound. **Tapping Sleeves for the Bracken County project shall be the stainless steel bolted sleeve.**

C. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

D. Tapping valves shall be suitable for a maximum working pressure of 200 psi with 125 lb. flanges

2.07 CUSTOMER SERVICE PRESSURE REDUCING VALVE (Not in Contract)

A. The individual customer service pressure reducing valve shall be hydraulically operated, spring loaded, diaphragm type control regulator. The valve shall be held open by the force of the compression spring above the diaphragm and shall maintain a constant delivery pressure downstream without shock or water hammer. Adjustments shall be made by an adjusting screw on top of the valve. Setting shall be as shown on the plans. The valve shall have a cast brass or bronze body and cover per ASTM B-62, stainless steel seat (Stainless Steel 303) and adjustment ranges of 40 to 300 psi.

B. The individual pressure reducing valve shall be equipped with a built-in by-pass to prevent a closed system on the customer's side of the meter service.

C. All valves shall be preceded by a strainer provided by the valve manufacturer and have a maximum working pressure the same as the pressure reducing valve.

D. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

2.08 MAIN LINE PRESSURE REDUCING VALVE (Not in Contract)

A. The pressure reducing valve shall maintain a constant downstream pressure regardless of varying inlet pressure. This valve shall be a hydraulically operated, diaphragm actuated, globe pattern valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross section, contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a bearing in the valve cover and integral bearing in the valve seat. This diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the vale, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls. All necessary repairs shall be possible without removing valve from the line.

B. The main valve body and cover shall be Cast Iron per ASTM A48, and the main valve trim shall be 303 stainless steel. The valve shall come equipped with a valve position indicator. The valve shall be equipped with a flow clean strainer, closing speed control, opening speed control and flow stabilizer. The valve shall be equipped with a V-port diaphragm plug for low flow conditions or approved equal by the Engineer.

C. The pilot control shall be a direct acting, adjustable, spring loaded, normally open, diaphragm valve, designed to permit flow when controlled pressure is less than the spring setting. The control system shall include a fixed orifice. The pilot control valve trim shall be 303 stainless steel.

D. The valve shall have a maximum working pressure rating as stated on the Drawings.

E. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

2.09 AIR RELEASE VALVE (Not in Contract)

A. The valve shall have a 1" screwed inlet diameter with a 1" corporation stop and a minimum of 3/32" size orifice. The body and cover shall be constructed of cast iron while the float shall be stainless steel. All internal parts, such as lever pins, retaining rings, screws, etc. shall be of stainless steel or bronze construction. Valves shall be suitable for use in lines with an operating pressure up to 175 psi. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

B. A service clamp shall be used to connect the air release valve to the water main. Service clamps and corporation stops shall be those as previously specified in Section 02650, except the corporation stops shall have a female IP thread outlet. All air releases shall contain a ball valve within the meter box for easy maintenance.

C. The air release valve box shall be a standard meter box with dimensions of 18" I.D. and a height of 36". The valve box cover shall be a standard water meter box cover.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Valves shall be installed as nearly as possible in the positions indicated on the Drawings consistent with conveniences of operating the handwheel or wrench. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.

B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.

C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense.

D. Valves shall be set plumb and supported adequately in conformance with the instructions of the manufacturer. Valves mounted on the face of concrete shall be shimmed vertically and grouted in place. Valves in the control piping shall be installed so as to be easily accessible.

3.02 INTERIOR PIPING INSTALLATION

A. It shall be the Contractor's responsibility to furnish a complete system of pipe supports, to provide expansion joints and to anchor all piping. The pipe support system shall be installed complete with all necessary inserts, bolts, nuts, rods, washers, miscellaneous steel, and other accessories.

B. In some instances, expansion joints have been shown on the drawings, but no attempt has been made to indicate every expansion joint for piping included under this portion of the specifications. Portions of the piping are shown on the detail drawings. Some of the piping, however, is shown only on the schematics.

C. Reaction Anchorage and Blocking: All piping exposed in interior locations and subject to internal pressure in which flexible connectors are used shall be blocked, anchored, or harnessed, as shown on the drawings, or as directed by the Engineer to preclude separation of joints.

3.03 PAINTING

Field painting is specified in elsewhere in these specifications.

- END OF SECTION -

SECTION 02645

HYDRANT ASSEMBLY

PART 1 - GENERAL

1.01 SCOPE

The Contractor shall furnish and install, where shown on the plans and additional locations as directed by the Owner, hydrant assemblies and blow-hydrants manufactured and equipped as described below.

PART 2 - PRODUCTS

2.01 FLUSHING HYDRANT ASSEMBLY

A. Hydrants shall conform in all respects to the requirements of AWWA C502. All hydrants shall have 6-inch mechanical joint shoe connection, two (2) 2-1/2" hose outlets, one (1) 4-1/2" pumper nozzle with caps. Connection threads and operation nuts shall conform to National Standard Specifications as adopted by National Board of Fire Underwriters. The hydrant shall be equipped with safety flanges designed to prevent barrel breakage when struck by a vehicle and an auxiliary gate valve.

B. Each hydrant shall be fully bronze mounted with the main valve having a threaded bronze seat ring assembly of such design that it is easily removable by unscrewing from a threaded bronze drain ring. Bronze drain ring shall have multiple ports providing positive automatic drainage as the main valve is opened or closed. Drainage waterways shall be completely bronze to prevent rust or corrosion.

C. Operating stems shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir protected from weather and the waterway with O-ring seals.

D. Hydrants shall be designed for 250 psi working pressure and shop tested to 400 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet. Hydrants shall have a UL/FM approved rating.

E. Each hydrant shall be installed with an auxiliary shut-off valve and valve box; valve box cover shall be marked "WATER" as required. Hydrants shall be secured to the shut-off valve by AWWA approved restraint joints, rodding with four (4) equally spaced all thread rods and "Duc-Lugs", or other equally approved method.

F. Inlet cover depth shall be 36" and the minimum dimension from ground to centerline of lowest opening shall be 18". Hydrants shall be supported on a poured-in-place concrete thrust block and provided with a drainage pit as indicated on Standard Detail Sheet.

G. All hydrants shall receive two (2) field coats of Koppers Company, Inc. Glamortex enamel (red). The Owner shall be furnished with two (2) hydrant barrel wrenches, four (4) spanner wrenches and two (2) operating nut wrenches.

H. Below ground hydrants shall be flush type with the upper barrel and nozzles contained in a cast iron box with a non locking lid.

I. *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE

J. Hydrant assemblies shall include the isolation valve and both valve and hydrant shall have a UL/FM approved rating.

2.02 BLOW-OFF ASSEMBLY (Not in Contract)

The underground blow off assembly shall be a gate valve, ninety degree fitting and pvc cap sized to fit the end of the pipe at surface level as shown on the standard detail drawings.

2.02 BLOW OFF HYDRANT (Not in Contract)

A. 3-inch Hydrants shall be self-draining, non-freezing, compression type with 2⅛" main valve opening. Inlet connection shall be MJ. Outlet shall be 2" IP. Hydrants shall be post type *SEE SECTION 01600 MATERIAL AND EQUIPMENT* for APPROVED MANUFACTURE.

B. Hydrants shall have a ductile iron pipe riser with a cast iron stock top, and non-turning operating rod. Principal interior operating parts shall be brass and removable from the hydrant for servicing without excavating the hydrant.

C. Flushing assembly installation shall also include all excavation, backfill, thrust blocking, and #9 crushed stone.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Hydrants shall be located as shown on the drawings unless otherwise specified by the Owner. Each hydrant shall be connected to the main with a 6-inch branch line having at least as much cover as the distribution main. Hydrants shall be set plumb with pumper nozzle facing the roadway and the cast-iron valve box set flush with the finished surrounding grade. Except where approved otherwise, the backfill around hydrants shall be thoroughly compacted to the finished gradeline immediately after installation to obtain beneficial use of the hydrant as soon as practicable. All hydrants shall be provided with a shut-off valve in the hydrant lateral as shown. All hydrants shall be installed in accordance with the manufacturer's directions and as detailed on the Contract Drawings.

B. Blow-off hydrants shall be located as shown on the drawings unless otherwise specified by the Utility. Each blow-off hydrant shall be connected to the main with at least as much cover as the distribution main. Blow-off hydrants shall be set plumb with nozzle facing the roadway and with the box cover set flush with the finished surrounding grade. The backfill around each hydrant shall be thoroughly compacted to the finished gradeline immediately after installation to obtain beneficial use of the hydrant as soon as practicable. All blow-off hydrants shall be provided with a shut-off valve in the lateral as shown.

- END OF SECTION -

SECTION 02700

SITE RESTORATION

PART 1 - GENERAL

1.01 CLEAN-UP

Upon completion of the installation of the water main and appurtenances, the Contractor shall remove all debris and surplus construction materials resulting from his work. The Contractor shall grade the ground along each side of the pipe trench and/or structure in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line.

PART 2 - PRODUCTS

2.01 SEEDING

A. All graded areas shall be seeded at the rate of six (6) pounds of seed per 1,000 square feet. The mixture shall consist of:

Kentucky 31 Fescue	60%
Creeping Red Fescue	20%
Annual Rye Grass	20%

B. After seed has been distributed, the Contractor shall cover areas with straw to a depth of 1-1/2". Any necessary re-seeding or repairing shall be accomplished by the Contractor before final acceptance. Seeding is not a pay item.

PART 3 - EXECUTION

3.01 SITE RESTORATION

A. After installation of water lines, the construction site will be restored to its original condition or better. All paved streets, roads, sidewalks, curbs, etc. removed or disturbed during construction shall be replaced, and all materials and workmanship shall conform to standard practices and specifications of the Owner, and/or to the Kentucky Department of Highways requirements, and specifications, whichever applies. Gravel, cinder or dirt streets, drives and shoulders shall be replaced and sufficiently compacted to provide a surface suitable for carrying the type of traffic normally imposed at the location.

B. All seeded areas shall be watered daily during the germination period, unless rain supplies the required moisture. The Contractor shall replace, at his own expense, trees, shrubs, etc. disturbed during construction.

C. The Contractor shall remove from the site all equipment, unused materials and other items at his expense. The construction site shall be left in a neat, orderly condition, clear of all unsightly items, before the Work is finally accepted.

- END OF SECTION -

EXHIBIT 9

Western Mason and Bracken Co Partial System Maps

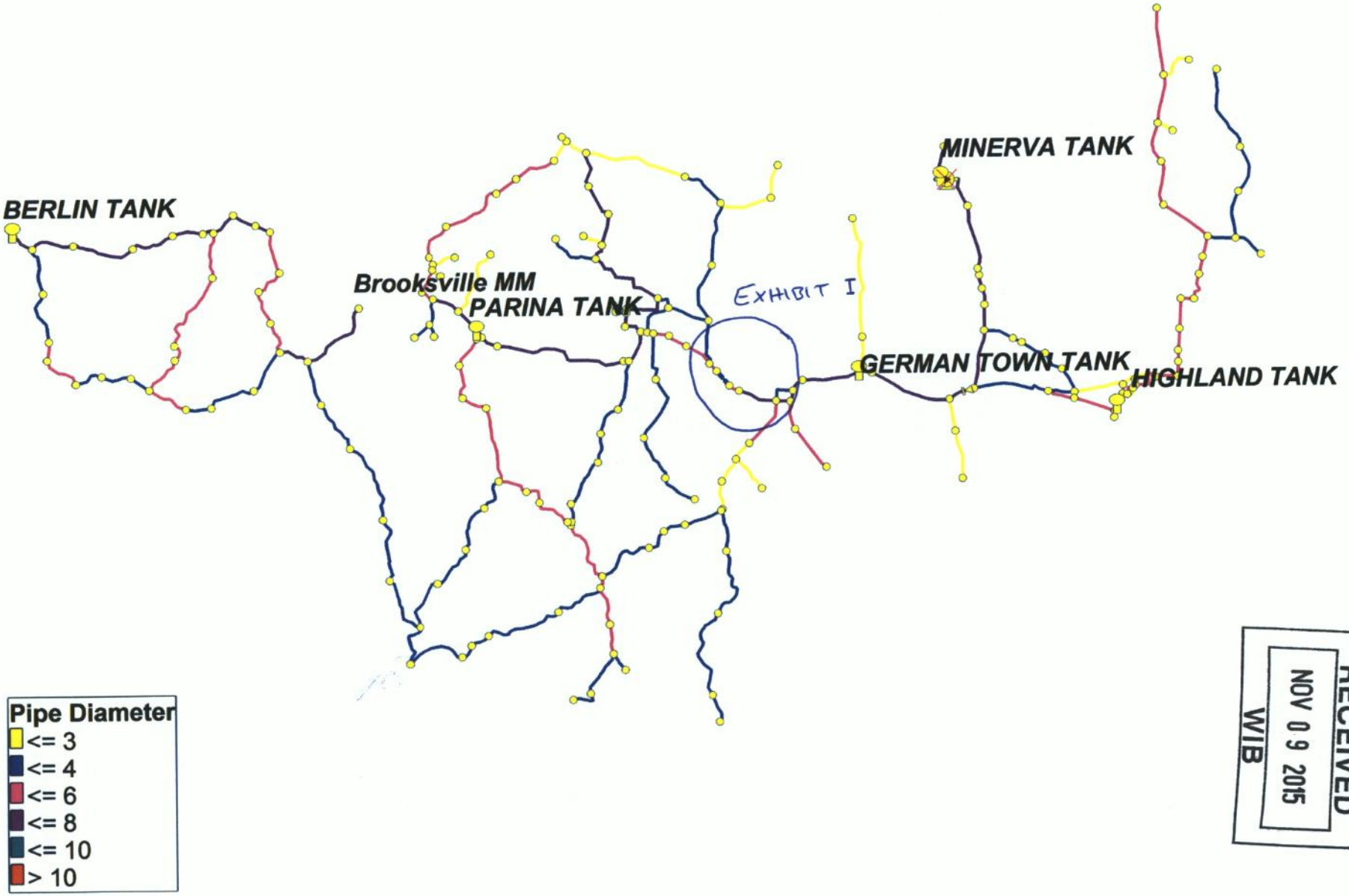
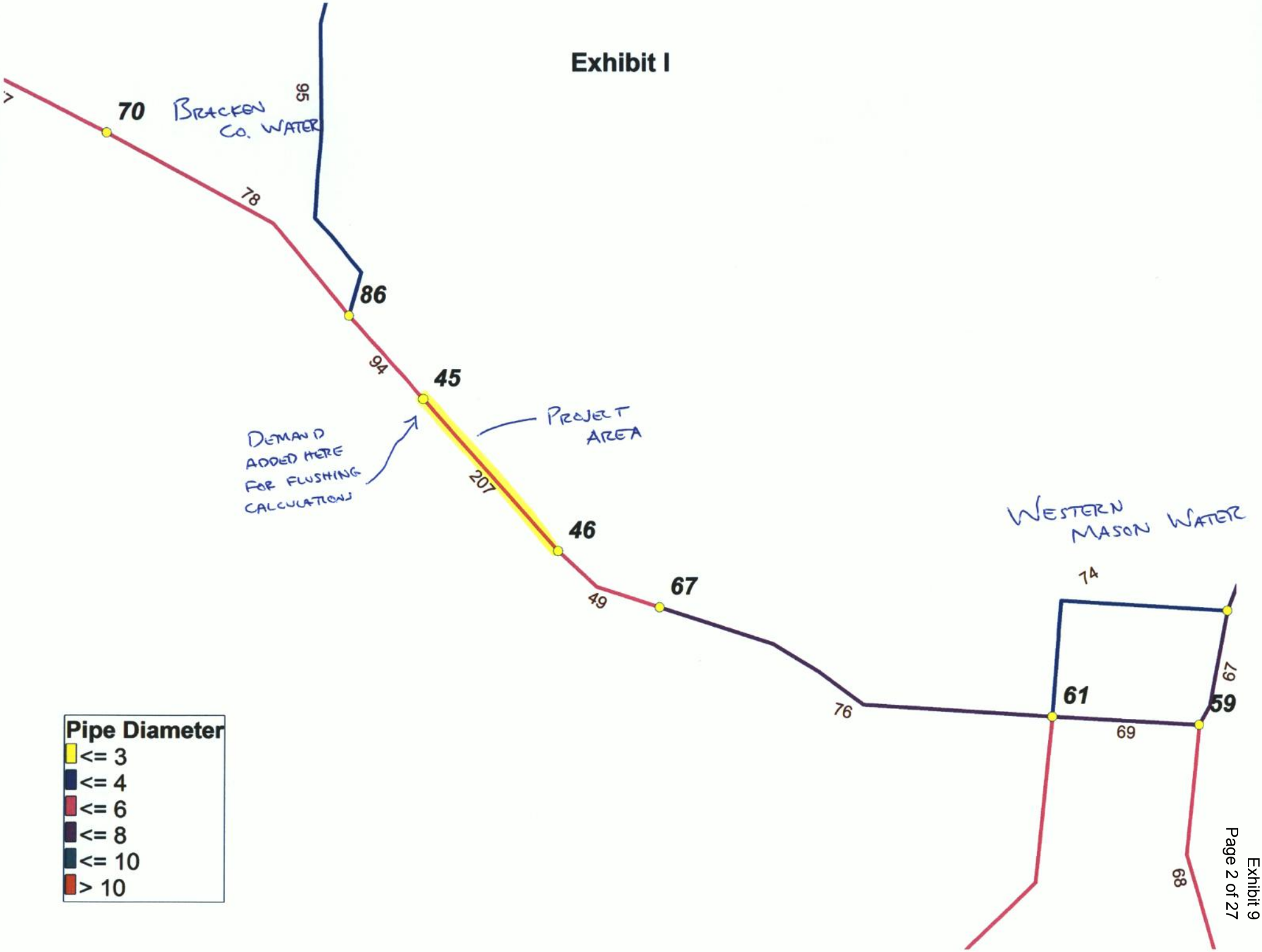


Exhibit I


70
BRACKEN CO. WATER
95
78
86
94
45
PROJECT AREA
207
DEMAND ADDED HERE FOR FLUSHING CALCULATIONS
46
49
67
WESTERN MASON WATER
74
67
61
59
76
69
68
Pipe Diameter
<= 3
<= 4
<= 6
<= 8
<= 10
> 10

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 7.022  07/03/2015                              *
*  Serial #:  10-10227220                                  *
*  Interface:  Classic                                     *
*  Licensed for Pipe2012                                   *
*                                                          *
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 Date & Time:  Mon Nov 02 09:39:19 2015

 Master File : p:\projects\bracken county water district\general\hydraulics\bracken_west-mason-peak.KYP\bracken_west-
mason-peak.P2K


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

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


 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
        MAXIMUM AND MINIMUM PRESSURES       =    5
        MAXIMUM AND MINIMUM VELOCITIES      =    5
        MAXIMUM AND MINIMUM HEAD LOSS/1000  =    5


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

     NUMBER OF PIPES ..................(P) =   207
     NUMBER OF END NODES ..............(J) =   191
     NUMBER OF PRIMARY LOOPS ..........(L) =    12
     NUMBER OF SUPPLY NODES ...........(F) =     5
     NUMBER OF SUPPLY ZONES ...........(Z) =     1
Case:   0


 RESULTS OBTAINED AFTER   11 TRIALS: ACCURACY = 0.19158E-05


 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)

 Bracken Co. Water District/Wester Mason Water
 District
 Partial System Map
 Peak Demand Calculations
 Junction Demands x Global Factor of 1.8


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

   STATUS CODE:   XX -CLOSED PIPE    CV -CHECK VALVE

   P I P E          NODE NUMBERS      FLOWRATE     HEAD  MINOR   LINE   HL+ML/    HL/
   N A M E          #1       #2                     LOSS  LOSS   VELO.  1000     1000
                                        gpm          ft    ft     ft/s   ft/f     ft/f
-------------------------------------------------------------------------------------
         2            1        27        6.03     0.01  0.00   0.07   0.01     0.01
         3            3        28        6.03     0.09  0.00   0.15   0.04     0.04
         4            2         4        7.65     0.03  0.00   0.09   0.01     0.01
         5            2        31       -7.02     0.02  0.00   0.08   0.01     0.01
         6            5        20      -34.05     0.03  0.00   0.22   0.03     0.03
         7            6        26        6.03     0.16  0.00   0.15   0.04     0.04
         8            4         7        7.65     0.12  0.00   0.20   0.06     0.06
         9            7        30        7.65     0.24  0.00   0.20   0.06     0.06
        10            9        25      -21.63     0.15  0.00   0.25   0.06     0.06
        11            5        21       21.63     0.03  0.00   0.14   0.02     0.02
        12            9        11       23.88     0.04  0.00   0.15   0.02     0.02
        13           11        10        9.00     0.02  0.00   0.06   0.00     0.00
        14           11        34       14.88     0.75  0.00   0.38   0.22     0.22
        15           13        37       -4.56     0.10  0.00   0.12   0.02     0.02
        16           14        13       14.88     1.00  0.00   0.38   0.22     0.22
        17           12        40      -62.49     2.49  0.00   0.71   0.44     0.44
        18           15       T-2     -136.32     0.09  0.00   0.87   0.46     0.46
        19           16         6       43.68     0.10  0.00   0.28   0.06     0.06
        20           17         6      -34.05     0.11  0.00   0.22   0.03     0.03
```

PEAK DEMAND CALCULATIONS

21	18	17	-34.05	0.16	0.00	0.22	0.03	0.03
22	19	18	-34.05	0.12	0.00	0.22	0.03	0.03
23	20	19	-34.05	0.08	0.00	0.22	0.03	0.03
24	21	22	21.63	0.03	0.00	0.14	0.02	0.02
25	22	8	21.63	0.02	0.00	0.14	0.02	0.02
26	23	8	-21.63	0.19	0.00	0.25	0.06	0.06
27	24	23	-21.63	0.14	0.00	0.25	0.06	0.06
28	25	24	-21.63	0.16	0.00	0.25	0.06	0.06
29	26	1	6.03	0.18	0.00	0.15	0.04	0.04
30	27	3	6.03	0.02	0.00	0.07	0.01	0.01
31	28	29	6.03	0.09	0.00	0.15	0.04	0.04
32	29	2	6.03	0.07	0.00	0.15	0.04	0.04
33	30	9	7.65	0.23	0.00	0.20	0.06	0.06
34	31	32	-7.02	0.01	0.00	0.08	0.01	0.01
35	32	33	-7.02	0.05	0.00	0.08	0.01	0.01
36	33	5	-7.02	0.03	0.00	0.08	0.01	0.01
37	34	35	14.88	0.91	0.00	0.38	0.22	0.22
38	35	36	14.88	1.40	0.00	0.38	0.22	0.22
39	36	14	14.88	1.08	0.00	0.38	0.22	0.22
40	37	38	-4.56	0.09	0.00	0.12	0.02	0.02
41	38	39	-9.96	0.40	0.00	0.25	0.10	0.10
42	39	12	-9.96	0.28	0.00	0.25	0.10	0.10
43	40	41	-62.49	0.87	0.00	0.71	0.44	0.44
44	41	42	-62.49	1.14	0.00	0.71	0.44	0.44
45	42	15	-62.49	1.05	0.00	0.71	0.44	0.44
46	15	98	64.84	0.05	0.00	0.41	0.12	0.12
47	43	127	25.24	0.20	0.00	0.16	0.02	0.02
48	44	88	-3.42	0.00	0.00	0.04	0.00	0.00
49	46	67	-50.40	0.25	0.00	0.57	0.29	0.29
50	48	75	9.00	0.00	0.00	0.06	0.00	0.00
51	47	54	-11.96	0.85	0.00	0.31	0.15	0.15
52	47	49	8.36	0.01	0.00	0.05	0.00	0.00
53	50	51	0.00	0.00	0.00	0.00	0.00	0.00
54	50	T-3	0.00	0.00	0.00	0.00	0.00	0.00
55	49	77	0.00	0.00	0.00	0.00	0.00	0.00
56	52	82	9.64	0.20	0.00	0.25	0.10	0.10
57	52	53	-9.30	0.04	0.00	0.24	0.09	0.09
58	54	52	0.34	0.00	0.00	0.01	0.00	0.00
59	54	53	-12.30	0.04	0.00	0.14	0.02	0.02
60	53	55	-27.00	0.29	0.00	0.31	0.09	0.09
61	55	56	0.00	0.00	0.00	0.00	0.00	0.00
62	55	T-4	-68.40	0.09	0.00	0.78	0.52	0.52
63	48	T-5	-122.40	0.15	0.00	0.78	0.37	0.37
64	48	74	14.40	2.16	0.00	0.65	0.84	0.84
65-XXCV	47	58						
66	58	76	5.40	2.40	0.00	0.55	0.99	0.99
67	59	68	-87.17	0.17	0.00	0.56	0.20	0.20
68	59	72	3.60	0.00	0.00	0.04	0.00	0.00
69	61	59	-65.57	0.12	0.00	0.42	0.12	0.12
70	61	66	9.00	0.05	0.00	0.10	0.01	0.01
71	63	71	9.00	0.69	0.00	0.41	0.35	0.35
72	63	65	0.00	0.00	0.00	0.00	0.00	0.00
73	66	63	9.00	0.57	0.00	0.41	0.35	0.35
74	61	68	-11.83	0.29	0.00	0.30	0.14	0.14
75	68	73	-99.00	0.28	0.00	0.63	0.25	0.25
76	67	61	-50.40	0.21	0.00	0.32	0.07	0.07
77	69	70	-32.14	0.19	0.00	0.36	0.13	0.13
78	70	86	-32.14	0.28	0.00	0.36	0.13	0.13
79	71	64	9.00	0.76	0.00	0.41	0.35	0.35
80	72	62	3.60	0.01	0.00	0.04	0.00	0.00
81	73	48	-99.00	1.11	0.00	0.63	0.25	0.25
82	74	57	9.00	3.21	0.00	0.41	0.35	0.35
83	75	58	5.40	0.01	0.00	0.03	0.00	0.00
84	76	60	5.40	3.55	0.00	0.55	0.99	0.99
85	77	79	0.00	0.00	0.00	0.00	0.00	0.00
86	78	80	0.00	0.00	0.00	0.00	0.00	0.00
87	79	78	0.00	0.00	0.00	0.00	0.00	0.00
88	80	81	0.00	0.00	0.00	0.00	0.00	0.00
89	81	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
90	82	83	9.64	0.18	0.00	0.25	0.10	0.10
91	83	84	9.64	0.19	0.00	0.25	0.10	0.10
92	84	85	9.64	0.07	0.00	0.25	0.10	0.10
93	85	49	9.64	0.22	0.00	0.25	0.10	0.10
94	86	45	-41.40	0.16	0.00	0.47	0.20	0.20
95	86	87	9.26	0.30	0.00	0.24	0.09	0.09
96	88	166	-17.74	0.02	0.00	0.20	0.04	0.04
97	88	96	-3.68	0.05	0.00	0.09	0.02	0.02
98	87	118	0.00	0.00	0.00	0.00	0.00	0.00
99	90	89	-12.60	0.56	0.00	0.32	0.16	0.16
100	90	119	3.60	0.26	0.00	0.16	0.06	0.06
101	89	94	-12.60	5.04	0.00	0.57	0.66	0.66
102	91	93	0.00	0.00	0.00	0.00	0.00	0.00
103	91	95	-12.60	1.13	0.00	0.57	0.66	0.66
104	94	91	-12.60	1.14	0.00	0.57	0.66	0.66
105	94	120	0.00	0.00	0.00	0.00	0.00	0.00
106	96	87	-9.26	0.29	0.00	0.24	0.09	0.09
107	96	97	5.58	0.05	0.00	0.14	0.04	0.04
108	97	113	-3.42	0.00	0.00	0.02	0.00	0.00
109	95	122	-21.60	0.20	0.00	0.25	0.06	0.06
110	98	43	25.24	0.03	0.00	0.16	0.02	0.02

111	99	104	-39.60	0.10	0.00	0.25	0.05	0.05
112	100	101	-21.60	0.02	0.00	0.25	0.06	0.06
113	100	102	0.00	0.00	0.00	0.00	0.00	0.00
114	101	126	-21.60	0.12	0.00	0.25	0.06	0.06
115	101	103	0.00	0.00	0.00	0.00	0.00	0.00
116	104	98	-39.60	0.12	0.00	0.25	0.05	0.05
117	104	106	0.00	0.00	0.00	0.00	0.00	0.00
118	99	107	0.00	0.00	0.00	0.00	0.00	0.00
119	107	105	0.00	0.00	0.00	0.00	0.00	0.00
120	107	109	0.00	0.00	0.00	0.00	0.00	0.00
121-XX	108	110						
122	108	111	0.00	0.00	0.00	0.00	0.00	0.00
123	110	97	-9.00	0.02	0.00	0.06	0.00	0.00
124	110	112	0.00	0.00	0.00	0.00	0.00	0.00
125	113	115	-3.42	0.00	0.00	0.02	0.00	0.00
126	113	114	0.00	0.00	0.00	0.00	0.00	0.00
127	115	117	-3.42	0.00	0.00	0.02	0.00	0.00
128	115	116	0.00	0.00	0.00	0.00	0.00	0.00
129	117	44	-3.42	0.00	0.00	0.02	0.00	0.00
130-XX	118	90						
131	119	92	3.60	0.16	0.00	0.16	0.06	0.06
132	120	121	0.00	0.00	0.00	0.00	0.00	0.00
133	121	108	0.00	0.00	0.00	0.00	0.00	0.00
134	122	123	-21.60	0.11	0.00	0.25	0.06	0.06
135	123	124	-21.60	0.30	0.00	0.25	0.06	0.06
136	124	125	-21.60	0.18	0.00	0.25	0.06	0.06
137	125	100	-21.60	0.04	0.00	0.25	0.06	0.06
138	126	99	-39.60	0.20	0.00	0.45	0.19	0.19
139	127	165	25.24	0.01	0.00	0.16	0.02	0.02
140	I-Pump-1	50	0.00	0.00	0.00	0.00	0.00	0.00
141	52	128	0.00	0.00	0.00	0.00	0.00	0.00
142	55	129	41.40	0.29	0.00	0.47	0.20	0.20
143	129	133	41.40	0.07	0.00	0.47	0.20	0.20
144	129	131	0.00	0.00	0.00	0.00	0.00	0.00
145	132	145	23.40	0.28	0.00	0.27	0.07	0.07
146	132	134	0.00	0.00	0.00	0.00	0.00	0.00
147	133	136	20.16	0.04	0.00	0.23	0.05	0.05
148	133	136	3.24	0.04	0.00	0.15	0.05	0.05
149	136	132	23.40	0.03	0.00	0.27	0.07	0.07
150	130	135	0.00	0.00	0.00	0.00	0.00	0.00
151	130	137	0.00	0.00	0.00	0.00	0.00	0.00
152	138	130	0.00	0.00	0.00	0.00	0.00	0.00
153	138	140	0.00	0.00	0.00	0.00	0.00	0.00
154	139	154	9.00	0.05	0.00	0.10	0.01	0.01
155	139	141	5.40	0.07	0.00	0.14	0.03	0.03
156	141	153	5.40	0.12	0.00	0.14	0.03	0.03
157	141	144	0.00	0.00	0.00	0.00	0.00	0.00
158	142	143	5.40	0.22	0.00	0.14	0.03	0.03
159	145	146	23.40	0.08	0.00	0.27	0.07	0.07
160	146	147	23.40	0.06	0.00	0.27	0.07	0.07
161	147	148	23.40	0.12	0.00	0.27	0.07	0.07
162	148	149	23.40	0.16	0.00	0.27	0.07	0.07
163	149	150	23.40	0.07	0.00	0.27	0.07	0.07
164	150	151	23.40	0.15	0.00	0.27	0.07	0.07
165	151	152	23.40	0.09	0.00	0.27	0.07	0.07
166	152	139	23.40	0.11	0.00	0.27	0.07	0.07
167	153	142	5.40	0.12	0.00	0.14	0.03	0.03
168	154	155	9.00	0.04	0.00	0.10	0.01	0.01
169	155	138	9.00	0.04	0.00	0.10	0.01	0.01
170	12	186	34.53	0.34	0.00	0.39	0.15	0.15
171	156	159	3.60	0.06	0.00	0.09	0.02	0.02
172	156	160	0.00	0.00	0.00	0.00	0.00	0.00
173	157	179	9.00	0.04	0.00	0.10	0.01	0.01
174	159	158	3.60	0.03	0.00	0.09	0.02	0.02
175	157	180	-1.44	0.01	0.00	0.04	0.00	0.00
176	161	164	41.76	1.03	0.00	0.47	0.21	0.21
177	162	187	-16.24	0.37	0.00	0.41	0.26	0.26
178	163	161	50.76	0.10	0.00	0.58	0.30	0.30
179	163	162	-16.24	0.01	0.00	0.18	0.04	0.04
180-XX	165	44						
181	164	157	7.56	0.01	0.00	0.09	0.01	0.01
182	164	178	16.20	1.21	0.00	0.41	0.26	0.26
183	166	69	-32.14	0.15	0.00	0.36	0.13	0.13
184	166	168	14.40	0.76	0.00	0.37	0.21	0.21
185	168	170	14.40	1.07	0.00	0.37	0.21	0.21
186	170	171	5.40	0.12	0.00	0.14	0.03	0.03
187	171	169	5.40	0.10	0.00	0.14	0.03	0.03
188	172	173	12.60	0.50	0.00	0.32	0.16	0.16
189	173	174	12.60	0.93	0.00	0.32	0.16	0.16
190	174	175	3.60	0.12	0.00	0.09	0.02	0.02
191	175	167	3.60	0.03	0.00	0.09	0.02	0.02
192	176	172	12.60	0.47	0.00	0.32	0.16	0.16
193	177	176	12.60	0.27	0.00	0.32	0.16	0.16
194	178	177	16.20	0.48	0.00	0.41	0.26	0.26
195	179	156	9.00	0.03	0.00	0.10	0.01	0.01
196	180	181	-1.44	0.02	0.00	0.04	0.00	0.00
197	181	182	-10.44	0.18	0.00	0.27	0.11	0.11
198	182	183	-10.44	0.13	0.00	0.27	0.11	0.11
199	183	184	-10.44	0.53	0.00	0.27	0.11	0.11
200	184	13	-10.44	0.41	0.00	0.27	0.11	0.11

201	185	163	34.53	0.41	0.00	0.39	0.15	0.15
202	186	185	34.53	0.25	0.00	0.39	0.15	0.15
203	187	188	-16.24	0.99	0.00	0.41	0.26	0.26
204	188	189	-25.24	1.28	0.00	0.64	0.59	0.59
205	189	190	-25.24	1.42	0.00	0.64	0.59	0.59
206	190	165	-25.24	2.20	0.00	0.64	0.59	0.59
207	46	45	46.80	0.37	0.00	0.53	0.26	0.26
P-1	T-1	16	43.68	0.01	0.00	0.28	0.06	0.06

PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	108.00	113.72	0.0	75.00	0.	0.0	0.0	**	**	141.2

NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
1		0.00	1099.56	960.00	139.56	60.47
2		5.40	1099.28	960.00	139.28	60.36
3		0.00	1099.53	967.00	132.53	57.43
4		0.00	1099.25	960.00	139.25	60.34
5		5.40	1099.39	881.00	218.39	94.64
6		3.60	1099.89	975.00	124.89	54.12
7		0.00	1099.13	968.00	131.13	56.82
8		0.00	1099.31	900.00	199.31	86.37
9		5.40	1098.67	955.00	143.67	62.26
10		9.00	1098.61	930.00	168.61	73.06
11		0.00	1098.63	946.00	152.63	66.14
12		18.00	1094.36	900.00	194.36	84.22
13		9.00	1093.49	640.00	453.49	196.51
14		0.00	1094.49	802.00	292.49	126.75
15		9.00	1099.91	960.00	139.91	60.63
16		0.00	1099.99	980.00	119.99	52.00
17		0.00	1099.78	939.00	160.78	69.67
18		0.00	1099.62	927.00	172.62	74.80
19		0.00	1099.50	900.00	199.50	86.45
20		0.00	1099.42	720.00	379.42	164.42
21		0.00	1099.36	900.00	199.36	86.39
22		0.00	1099.33	700.00	399.33	173.04
23		0.00	1099.12	920.00	179.12	77.62
24		0.00	1098.98	870.00	228.98	99.22
25		0.00	1098.82	940.00	158.82	68.82
26		0.00	1099.74	973.00	126.74	54.92
27		0.00	1099.55	976.00	123.55	53.54
28		0.00	1099.44	960.00	139.44	60.42
29		0.00	1099.35	950.00	149.35	64.72
30		0.00	1098.90	943.00	155.90	67.55
31		0.00	1099.30	910.00	189.30	82.03
32		0.00	1099.31	934.00	165.31	71.64
33		0.00	1099.36	900.00	199.36	86.39
34		0.00	1097.88	900.00	197.88	85.75
35		0.00	1096.97	900.00	196.97	85.35
36		0.00	1095.57	875.00	220.57	95.58
37		0.00	1093.60	820.00	273.60	118.56
38		5.40	1093.68	880.00	213.68	92.60
39		0.00	1094.08	908.00	186.08	80.63
40		0.00	1096.85	920.00	176.85	76.64
41		0.00	1097.72	936.00	161.72	70.08
42		0.00	1098.86	958.00	140.86	61.04
43		0.00	1099.84	940.00	159.84	69.26
44		0.00	1096.55	980.00	116.55	50.50
45		5.40	1097.35	940.00	157.35	68.19
46		3.60	1097.72	950.00	147.72	64.01
47		3.60	1053.73	944.00	109.73	47.55
48		0.00	1099.85	977.00	122.85	53.24
49		18.00	1053.72	962.00	91.72	39.74
50		0.00	1048.00	940.00	108.00	46.80
51		0.00	1048.00	950.00	98.00	42.47
52		0.00	1054.57	892.00	162.57	70.45
53		5.40	1054.62	890.00	164.62	71.33
54		0.00	1054.57	940.00	114.57	49.65
55		0.00	1054.91	960.00	94.91	41.13
56		0.00	1054.91	960.00	94.91	41.13
57		9.00	1094.48	920.00	174.48	75.61
58		0.00	1099.84	946.00	153.84	66.66
59		18.00	1098.30	970.00	128.30	55.60
60		5.40	1093.89	939.00	154.89	67.12

61	18.00	1098.17	970.00	128.17	55.54
62	3.60	1098.28	917.00	181.28	78.56
63	0.00	1097.55	951.00	146.55	63.51
64	9.00	1096.10	960.00	136.10	58.98
65	0.00	1097.55	940.00	157.55	68.27
66	0.00	1098.13	933.00	165.13	71.56
67	0.00	1097.96	967.00	130.96	56.75
68	0.00	1098.46	970.00	128.46	55.67
69	0.00	1096.72	945.00	151.72	65.75
70	0.00	1096.91	980.00	116.91	50.66
71	0.00	1096.86	965.00	131.86	57.14
72	0.00	1098.29	965.00	133.29	57.76
73	0.00	1098.74	960.00	138.74	60.12
74	5.40	1097.69	957.00	140.69	60.97
75	3.60	1099.85	963.00	136.85	59.30
76	0.00	1097.44	936.00	161.44	69.96
77	0.00	1053.72	912.00	141.72	61.41
78	0.00	1053.72	910.00	143.72	62.28
79	0.00	1053.72	943.00	110.72	47.98
80	0.00	1053.72	944.00	109.72	47.54
81	0.00	1053.72	937.00	116.72	50.58
82	0.00	1054.38	940.00	114.38	49.56
83	0.00	1054.20	850.00	204.20	88.49
84	0.00	1054.01	930.00	124.01	53.74
85	0.00	1053.94	890.00	163.94	71.04
86	0.00	1097.19	960.00	137.19	59.45
87	0.00	1096.89	980.00	116.89	50.65
88	18.00	1096.55	940.00	156.55	67.84
89	0.00	1091.18	937.00	154.18	66.81
90	9.00	1090.61	950.00	140.61	60.93
91	0.00	1097.35	912.00	185.35	80.32
92	3.60	1090.19	920.00	170.19	73.75
93	0.00	1097.35	910.00	187.35	81.19
94	0.00	1096.22	920.00	176.22	76.36
95	9.00	1098.49	920.00	178.49	77.34
96	0.00	1096.60	880.00	216.60	93.86
97	0.00	1096.55	900.00	196.55	85.17
98	0.00	1099.86	962.00	137.86	59.74
99	0.00	1099.65	945.00	154.65	67.01
100	0.00	1099.31	940.00	159.31	69.03
101	0.00	1099.33	960.00	139.33	60.38
102	0.00	1099.31	940.00	159.31	69.03
103	0.00	1099.33	940.00	159.33	69.04
104	0.00	1099.74	959.00	140.74	60.99
105	0.00	1099.65	940.00	159.65	69.18
106	0.00	1099.74	950.00	149.74	64.89
107	0.00	1099.65	940.00	159.65	69.18
108	0.00	1096.22	920.00	176.22	76.36
109	0.00	1099.65	920.00	179.65	77.85
110	9.00	1096.53	942.00	154.53	66.96
111	0.00	1096.22	920.00	176.22	76.36
112	0.00	1096.53	920.00	176.53	76.50
113	0.00	1096.55	960.00	136.55	59.17
114	0.00	1096.55	960.00	136.55	59.17
115	0.00	1096.55	950.00	146.55	63.50
116	0.00	1096.55	960.00	136.55	59.17
117	0.00	1096.55	967.00	129.55	56.14
118	0.00	1096.89	957.00	139.89	60.62
119	0.00	1090.36	960.00	130.36	56.49
120	0.00	1096.22	770.00	326.22	141.36
121	0.00	1096.22	920.00	176.22	76.36
122	0.00	1098.68	730.00	368.68	159.76
123	0.00	1098.80	920.00	178.80	77.48
124	0.00	1099.09	940.00	159.09	68.94
125	0.00	1099.27	970.00	129.27	56.02
126	18.00	1099.45	940.00	159.45	69.10
127	0.00	1099.64	949.00	150.64	65.28
128	0.00	1054.57	900.00	154.57	66.98
129	0.00	1054.62	940.00	114.62	49.67
130	0.00	1053.23	893.00	160.23	69.43
131	0.00	1054.62	950.00	104.62	45.33
132	0.00	1054.47	940.00	114.47	49.60
133	18.00	1054.55	930.00	124.55	53.97
134	0.00	1054.47	940.00	114.47	49.60
135	0.00	1053.23	880.00	173.23	75.07
136	0.00	1054.50	930.00	124.50	53.95
137	0.00	1053.23	900.00	153.23	66.40
138	9.00	1053.23	900.00	153.23	66.40
139	9.00	1053.36	872.00	181.36	78.59
140	0.00	1053.23	900.00	153.23	66.40
141	0.00	1053.29	930.00	123.29	53.43
142	0.00	1053.04	910.00	143.04	61.99
143	5.40	1052.83	500.00	552.83	239.56
144	0.00	1053.29	850.00	203.29	88.09
145	0.00	1054.19	865.00	189.19	81.98
146	0.00	1054.11	920.00	134.11	58.12
147	0.00	1054.05	880.00	174.05	75.42
148	0.00	1053.94	920.00	133.94	58.04
149	0.00	1053.78	940.00	113.78	49.31
150	0.00	1053.71	940.00	113.71	49.28

151		0.00	1053.56	890.00	163.56	70.88
152		0.00	1053.47	930.00	123.47	53.50
153		0.00	1053.17	900.00	153.17	66.37
154		0.00	1053.31	915.00	138.31	59.93
155		0.00	1053.27	900.00	153.27	66.42
156		5.40	1092.15	900.00	192.15	83.27
157		0.00	1092.21	919.00	173.21	75.06
158		3.60	1092.06	653.00	439.06	190.26
159		0.00	1092.09	831.00	261.09	113.14
160		0.00	1092.15	920.00	172.15	74.60
161		9.00	1093.26	898.00	195.26	84.61
162		0.00	1093.37	890.00	203.37	88.13
163		0.00	1093.36	900.00	193.36	83.79
164		18.00	1092.22	921.00	171.22	74.20
165		0.00	1099.63	950.00	149.63	64.84
166		0.00	1096.57	940.00	156.57	67.85
167		3.60	1088.20	640.00	448.20	194.22
168		0.00	1095.81	960.00	135.81	58.85
169		5.40	1094.52	800.00	294.52	127.62
170		9.00	1094.73	950.00	144.73	62.72
171		0.00	1094.61	750.00	344.61	149.33
172		0.00	1089.79	960.00	129.79	56.24
173		0.00	1089.28	942.00	147.28	63.82
174		9.00	1088.35	922.00	166.35	72.09
175		0.00	1088.24	860.00	228.24	98.90
176		0.00	1090.26	933.00	157.26	68.15
177		3.60	1090.53	945.00	145.53	63.06
178		0.00	1091.02	920.00	171.02	74.11
179		0.00	1092.18	900.00	192.18	83.28
180		0.00	1092.23	905.00	187.23	81.13
181		9.00	1092.24	810.00	282.24	122.31
182		0.00	1092.42	860.00	232.42	100.71
183		0.00	1092.55	800.00	292.55	126.77
184		0.00	1093.09			
185		0.00	1093.77	700.00	393.77	170.63
186		0.00	1094.02	900.00	194.02	84.07
187		0.00	1093.74	710.00	383.74	166.29
188		9.00	1094.73	790.00	304.73	132.05
189		0.00	1096.01	930.00	166.01	71.94
190		0.00	1097.43	949.00	148.43	64.32
O-Pump-1	Minerva PS	0.00	1053.72	940.00	113.72	49.28
T-1	Berlin Tank	----	1100.00	980.00	120.00	52.00
T-2	Perina Tank	----	1100.00	960.00	140.00	60.67
T-3	Minerva Tank	----	1048.00	940.00	108.00	46.80
T-4	Highland Tan	----	1055.00	960.00	95.00	41.17
T-5	German Town	----	1100.00	980.00	120.00	52.00
I-Pump-1	Minerva PS	0.00	1048.00	940.00	108.00	46.80

MAXIMUM AND MINIMUM VALUES

PRESSURES

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
143	239.56	49	39.74
13	196.51	55	41.13
167	194.22	56	41.13
158	190.26	T-4	41.17
22	173.04	51	42.47

VELOCITIES

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
18	0.87	58	0.01
63	0.78	108	0.02
62	0.78	125	0.02
17	0.71	127	0.02
43	0.71	129	0.02

HL+ML / 1000

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
84	0.99	58	0.00
66	0.99	108	0.00
64	0.84	125	0.00
101	0.66	127	0.00
103	0.66	129	0.00

HL / 1000

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
84	0.99	58	0.00
66	0.99	108	0.00
64	0.84	125	0.00
101	0.66	127	0.00
103	0.66	129	0.00

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 SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
T-1	43.68	Berlin Tank
T-2	136.32	Perina Tank
T-3	0.00	Minerva Tank
T-4	68.40	Highland Tan
T-5	122.40	German Town

NET SYSTEM INFLOW = 370.80
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 370.80

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * * * * * * * * KYPIPE * * * * * * * * * * * *
*                                                      *
*  Pipe Network Modeling Software                      *
*                                                      *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)          *
*  Version: 7.022  07/03/2015                          *
*  Serial #:  10-10227220                              *
*  Interface:  Classic                                 *
*  Licensed for Pipe2012                               *
*                                                      *
* * * * * * * * * * * * * * * * * * * * * * * * * * * *

Date & Time:  Mon Nov 02 09:21:37 2015

Master File : p:\projects\bracken county water district\general\hydraulics\bracken_west-mason.KYP\bracken_west-mason.P2K

                ***********************************************
                 S U M M A R Y   O F   O R I G I N A L   D A T A
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CASE 0 - AVERAGE USAGE

CASE 1 - FLUSHING VELOCITY

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

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
2	1	27	1378.90	6.00	130.0000	0.00
3	3	28	2164.04	4.00	130.0000	0.00
4	2	4	3125.22	6.00	130.0000	0.00
5	2	31	3042.08	6.00	130.0000	0.00
6	5	20	902.86	8.00	130.0000	0.00
7	6	26	3589.53	4.00	125.0000	0.00
8	4	7	1872.26	4.00	130.0000	0.00
9	7	30	3698.45	4.00	130.0000	0.00
10	9	25	2490.91	6.00	130.0000	0.00
11	5	21	1980.88	8.00	130.0000	0.00
12	9	11	2314.75	8.00	130.0000	0.00
13	11	10	6099.35	8.00	130.0000	0.00
14	11	34	3399.13	4.00	130.0000	0.00
15	13	37	4139.81	4.00	130.0000	0.00
16	14	13	4522.25	4.00	130.0000	0.00
17	12	40	5713.84	6.00	130.0000	0.00
18	15	T-2	190.58	8.00	130.0000	0.00
19	16	6	1733.69	8.00	130.0000	0.00
20	17	6	3263.74	8.00	130.0000	0.00
21	18	17	4719.26	8.00	130.0000	0.00
22	19	18	3293.91	8.00	130.0000	0.00
23	20	19	2276.80	8.00	130.0000	0.00
24	21	22	1838.64	8.00	130.0000	0.00
25	22	8	1188.48	8.00	130.0000	0.00
26	23	8	3172.28	6.00	130.0000	0.00
27	24	23	2288.16	6.00	130.0000	0.00
28	25	24	2624.32	6.00	130.0000	0.00
29	26	1	4018.83	4.00	125.0000	0.00
30	27	3	2990.41	6.00	130.0000	0.00
31	28	29	2255.50	4.00	130.0000	0.00
32	29	2	1620.74	4.00	130.0000	0.00
33	30	9	3549.52	4.00	130.0000	0.00
34	31	32	1324.02	6.00	130.0000	0.00
35	32	33	6370.42	6.00	130.0000	0.00
36	33	5	3490.59	6.00	130.0000	0.00
37	34	35	4109.39	4.00	130.0000	0.00
38	35	36	6333.11	4.00	130.0000	0.00
39	36	14	4919.95	4.00	130.0000	0.00
40	37	38	3456.17	4.00	130.0000	0.00
41	38	39	3781.05	4.00	130.0000	0.00
42	39	12	2669.07	4.00	130.0000	0.00
43	40	41	1994.41	6.00	130.0000	0.00
44	41	42	2614.76	6.00	130.0000	0.00
45	42	15	2404.86	6.00	130.0000	0.00
46	15	98	428.35	8.00	130.0000	0.00
47	43	127	9942.67	8.00	130.0000	0.00
48	44	88	483.33	6.00	130.0000	0.00
49	46	67	836.08	6.00	130.0000	0.00
50	48	75	877.48	8.00	130.0000	0.00
51	47	54	5762.47	4.00	130.0000	0.00

52	47	49	4395.70	8.00	130.0000	0.00
53	50	51	2488.21	8.00	130.0000	0.00
54	50	T-3	405.30	8.00	130.0000	0.00
55	49	77	1917.25	8.00	130.0000	0.00
56	52	82	1981.97	4.00	130.0000	0.00
57	52	53	471.67	4.00	130.0000	0.00
58	54	52	1935.32	4.00	130.0000	0.00
59	54	53	2006.00	6.00	130.0000	0.00
60	53	55	3118.00	6.00	130.0000	0.00
61	55	56	489.11	6.00	130.0000	0.00
62	55	T-4	183.81	6.00	130.0000	0.00
63	48	T-5	397.59	8.00	130.0000	0.00
64	48	74	2565.82	3.00	130.0000	0.00
65-CV	47	58	2026.51	8.00	130.0000	0.00
66	58	76	2434.95	2.00	130.0000	0.00
67	59	68	834.98	8.00	130.0000	0.00
68	59	72	2152.97	6.00	130.0000	0.00
69	61	59	1045.84	8.00	130.0000	0.00
70	61	66	3911.92	6.00	130.0000	0.00
71	63	71	1966.45	3.00	130.0000	0.00
72	63	65	2967.94	3.00	130.0000	0.00
73	66	63	1622.75	3.00	130.0000	0.00
74	61	68	2007.49	4.00	130.0000	0.00
75	68	73	1114.75	8.00	130.0000	0.00
76	67	61	2932.21	8.00	130.0000	0.00
77	69	70	1516.69	6.00	130.0000	0.00
78	70	86	2176.08	6.00	130.0000	0.00
79	71	64	2146.56	3.00	130.0000	0.00
80	72	62	3679.10	6.00	130.0000	0.00
81	73	48	4390.32	8.00	130.0000	0.00
82	74	57	9100.19	3.00	130.0000	0.00
83	75	58	6223.55	8.00	130.0000	0.00
84	76	60	3601.45	2.00	130.0000	0.00
85	77	79	1240.43	8.00	130.0000	0.00
86	78	80	504.80	8.00	130.0000	0.00
87	79	78	1032.04	8.00	130.0000	0.00
88	80	81	4794.89	8.00	130.0000	0.00
89	81	O-Pump-1	2569.22	8.00	130.0000	0.00
90	82	83	1790.30	4.00	130.0000	0.00
91	83	84	1955.28	4.00	130.0000	0.00
92	84	85	702.38	4.00	130.0000	0.00
93	85	49	2270.63	4.00	130.0000	0.00
94	86	45	790.92	6.00	130.0000	0.00
95	86	87	3318.13	4.00	130.0000	0.00
96	88	166	461.86	6.00	130.0000	0.00
97	88	96	2839.38	4.00	130.0000	0.00
98	87	118	4647.89	4.00	130.0000	0.00
99	90	89	3462.30	4.00	130.0000	0.00
100	90	119	4008.84	3.00	130.0000	0.00
101	89	94	7666.46	3.00	130.0000	0.00
102	91	93	454.25	3.00	130.0000	0.00
103	91	95	1721.37	3.00	130.0000	0.00
104	94	91	1727.81	3.00	130.0000	0.00
105	94	120	2676.44	8.00	130.0000	0.00
106	96	87	3138.31	4.00	130.0000	0.00
107	96	97	1422.96	4.00	130.0000	0.00
108	97	113	3129.50	8.00	130.0000	0.00
109	95	122	3249.66	6.00	130.0000	0.00
110	98	43	1355.49	8.00	130.0000	0.00
111	99	104	2116.34	8.00	130.0000	0.00
112	100	101	383.67	6.00	130.0000	0.00
113	100	102	1749.87	3.00	130.0000	0.00
114	101	126	1899.44	6.00	130.0000	0.00
115	101	103	765.70	3.00	130.0000	0.00
116	104	98	2603.00	8.00	130.0000	0.00
117	104	106	5306.96	3.00	130.0000	0.00
118	99	107	1999.99	4.00	130.0000	0.00
119	107	105	1555.86	4.00	130.0000	0.00
120	107	109	971.80	4.00	130.0000	0.00
121-XX	108	110	1221.36	8.00	130.0000	0.00
122	108	111	1597.65	3.00	130.0000	0.00
123	110	97	6054.33	8.00	130.0000	0.00
124	110	112	3670.68	4.00	130.0000	0.00
125	113	115	272.02	8.00	130.0000	0.00
126	113	114	1115.67	4.00	130.0000	0.00
127	115	117	1017.69	8.00	130.0000	0.00
128	115	116	764.89	4.00	130.0000	0.00
129	117	44	1331.09	8.00	130.0000	0.00
130-XX	118	90	4790.06	4.00	130.0000	0.00
131	119	92	2523.50	3.00	130.0000	0.00
132	120	121	2641.87	8.00	130.0000	0.00
133	121	108	2397.42	8.00	130.0000	0.00
134	122	123	1825.04	6.00	130.0000	0.00
135	123	124	4895.80	6.00	130.0000	0.00
136	124	125	2905.93	6.00	130.0000	0.00
137	125	100	629.93	6.00	130.0000	0.00
138	126	99	1043.72	6.00	130.0000	0.00
139	127	165	390.10	8.00	130.0000	0.00
140	I-Pump-1	50	269.40	8.00	130.0000	0.00
141	52	128	6202.23	3.00	130.0000	0.00

142	55	129	1408.93	6.00	130.0000	0.00
143	129	133	354.15	6.00	130.0000	0.00
144	129	131	662.79	6.00	130.0000	0.00
145	132	145	4001.44	6.00	130.0000	0.00
146	132	134	428.35	6.00	130.0000	0.00
147	133	136	834.53	6.00	130.0000	0.00
148	133	136	843.14	3.00	130.0000	0.00
149	136	132	402.11	6.00	130.0000	0.00
150	130	135	5063.77	6.00	130.0000	0.00
151	130	137	2752.89	3.00	130.0000	0.00
152	138	130	3632.38	6.00	130.0000	0.00
153	138	140	1304.57	3.00	130.0000	0.00
154	139	154	4024.21	6.00	130.0000	0.00
155	139	141	2051.15	4.00	130.0000	0.00
156	141	153	3599.26	4.00	130.0000	0.00
157	141	144	2417.89	4.00	130.0000	0.00
158	142	143	6459.26	4.00	130.0000	0.00
159	145	146	1090.27	6.00	130.0000	0.00
160	146	147	830.48	6.00	130.0000	0.00
161	147	148	1628.45	6.00	130.0000	0.00
162	148	149	2215.27	6.00	130.0000	0.00
163	149	150	979.72	6.00	130.0000	0.00
164	150	151	2111.90	6.00	130.0000	0.00
165	151	152	1325.06	6.00	130.0000	0.00
166	152	139	1547.47	6.00	130.0000	0.00
167	153	142	3701.15	4.00	130.0000	0.00
168	154	155	3355.83	6.00	130.0000	0.00
169	155	138	3113.62	6.00	130.0000	0.00
170	12	186	2343.57	6.00	130.0000	0.00
171	156	159	3551.77	4.00	130.0000	0.00
172	156	160	1470.20	4.00	130.0000	0.00
173	157	179	2935.45	6.00	130.0000	0.00
174	159	158	1970.95	4.00	130.0000	0.00
175	157	180	3889.29	4.00	130.0000	0.00
176	161	164	4993.80	6.00	130.0000	0.00
177	162	187	1420.82	4.00	130.0000	0.00
178	163	161	350.54	6.00	130.0000	0.00
179	163	162	297.95	6.00	130.0000	0.00
180-XX	165	44	2438.29	8.00	130.0000	0.00
181	164	157	903.58	6.00	130.0000	0.00
182	164	178	4673.50	4.00	130.0000	0.00
183	166	69	1171.65	6.00	130.0000	0.00
184	166	168	3686.85	4.00	130.0000	0.00
185	168	170	5169.14	4.00	130.0000	0.00
186	170	171	3524.52	4.00	130.0000	0.00
187	171	169	2831.72	4.00	130.0000	0.00
188	172	173	3113.63	4.00	130.0000	0.00
189	173	174	5739.16	4.00	130.0000	0.00
190	174	175	7389.13	4.00	130.0000	0.00
191	175	167	2158.33	4.00	130.0000	0.00
192	176	172	2913.16	4.00	130.0000	0.00
193	177	176	1670.40	4.00	130.0000	0.00
194	178	177	1878.20	4.00	130.0000	0.00
195	179	156	2249.26	6.00	130.0000	0.00
196	180	181	5927.20	4.00	130.0000	0.00
197	181	182	1536.83	4.00	130.0000	0.00
198	182	183	1169.35	4.00	130.0000	0.00
199	183	184	4668.13	4.00	130.0000	0.00
200	184	13	3573.15	4.00	130.0000	0.00
201	185	163	2795.77	6.00	130.0000	0.00
202	186	185	1722.81	6.00	130.0000	0.00
203	187	188	3811.93	4.00	130.0000	0.00
204	188	189	2187.35	4.00	130.0000	0.00
205	189	190	2418.47	4.00	130.0000	0.00
206	190	165	3753.74	4.00	130.0000	0.00
207	46	45	1434.15	6.00	130.0000	0.00
P-1	T-1	16	164.53	8.00	130.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)	
200.00	0.00	75.00	(Default)
150.00	200.00	75.00	(Default)
80.00	310.00	75.00	(Default)

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)

1	0.00	960.00
2	3.00	960.00
3	0.00	967.00
4	0.00	960.00
5	3.00	881.00
6	2.00	975.00
7	0.00	968.00
8	0.00	900.00
9	3.00	955.00
10	5.00	930.00
11	0.00	946.00
12	10.00	900.00
13	5.00	640.00
14	0.00	802.00
15	5.00	960.00
16	0.00	980.00
17	0.00	939.00
18	0.00	927.00
19	0.00	900.00
20	0.00	720.00
21	0.00	900.00
22	0.00	700.00
23	0.00	920.00
24	0.00	870.00
25	0.00	940.00
26	0.00	973.00
27	0.00	976.00
28	0.00	960.00
29	0.00	950.00
30	0.00	943.00
31	0.00	910.00
32	0.00	934.00
33	0.00	900.00
34	0.00	900.00
35	0.00	900.00
36	0.00	875.00
37	0.00	820.00
38	3.00	880.00
39	0.00	908.00
40	0.00	920.00
41	0.00	936.00
42	0.00	958.00
43	0.00	940.00
44	0.00	980.00
45	3.00	940.00
46	2.00	950.00
47	2.00	944.00
48	0.00	977.00
49	10.00	962.00
50	0.00	940.00
51	0.00	950.00
52	0.00	892.00
53	3.00	890.00
54	0.00	940.00
55	0.00	960.00
56	0.00	960.00
57	5.00	920.00
58	0.00	946.00
59	10.00	970.00
60	3.00	939.00
61	10.00	970.00
62	2.00	917.00
63	0.00	951.00
64	5.00	960.00
65	0.00	940.00
66	0.00	933.00
67	0.00	967.00
68	0.00	970.00
69	0.00	945.00
70	0.00	980.00
71	0.00	965.00
72	0.00	965.00
73	0.00	960.00
74	3.00	957.00
75	2.00	963.00
76	0.00	936.00
77	0.00	912.00
78	0.00	910.00
79	0.00	943.00
80	0.00	944.00
81	0.00	937.00
82	0.00	940.00
83	0.00	850.00
84	0.00	930.00
85	0.00	890.00
86	0.00	960.00
87	0.00	980.00
88	10.00	940.00
89	0.00	937.00
90	5.00	950.00

91	0.00	912.00
92	2.00	920.00
93	0.00	910.00
94	0.00	920.00
95	5.00	920.00
96	0.00	880.00
97	0.00	900.00
98	0.00	962.00
99	0.00	945.00
100	0.00	940.00
101	0.00	960.00
102	0.00	940.00
103	0.00	940.00
104	0.00	959.00
105	0.00	940.00
106	0.00	950.00
107	0.00	940.00
108	0.00	920.00
109	0.00	920.00
110	5.00	942.00
111	0.00	920.00
112	0.00	920.00
113	0.00	960.00
114	0.00	960.00
115	0.00	950.00
116	0.00	960.00
117	0.00	967.00
118	0.00	957.00
119	0.00	960.00
120	0.00	770.00
121	0.00	920.00
122	0.00	730.00
123	0.00	920.00
124	0.00	940.00
125	0.00	970.00
126	10.00	940.00
127	0.00	949.00
128	0.00	900.00
129	0.00	940.00
130	0.00	893.00
131	0.00	950.00
132	0.00	940.00
133	10.00	930.00
134	0.00	940.00
135	0.00	880.00
136	0.00	930.00
137	0.00	900.00
138	5.00	900.00
139	5.00	872.00
140	0.00	900.00
141	0.00	930.00
142	0.00	910.00
143	3.00	500.00
144	0.00	850.00
145	0.00	865.00
146	0.00	920.00
147	0.00	880.00
148	0.00	920.00
149	0.00	940.00
150	0.00	940.00
151	0.00	890.00
152	0.00	930.00
153	0.00	900.00
154	0.00	915.00
155	0.00	900.00
156	3.00	900.00
157	0.00	919.00
158	2.00	653.00
159	0.00	831.00
160	0.00	920.00
161	5.00	898.00
162	0.00	890.00
163	0.00	900.00
164	10.00	921.00
165	0.00	950.00
166	0.00	940.00
167	2.00	640.00
168	0.00	960.00
169	3.00	800.00
170	5.00	950.00
171	0.00	750.00
172	0.00	960.00
173	0.00	942.00
174	5.00	922.00
175	0.00	860.00
176	0.00	933.00
177	2.00	945.00
178	0.00	920.00
179	0.00	900.00
180	0.00	905.00

181		5.00	810.00	
182		0.00	860.00	
183		0.00	800.00	
184		0.00	0.00	
185		0.00	700.00	
186		0.00	900.00	
187		0.00	710.00	
188		5.00	790.00	
189		0.00	930.00	
190		0.00	949.00	
O-Pump-1	Minerva PS	0.00	940.00	
T-1	Berlin Tank	----	980.00	1100.00
T-2	Perina Tank	----	960.00	1100.00
T-3	Minerva Tank	----	940.00	1048.00
T-4	Highland Tan	----	960.00	1055.00
T-5	German Town	----	980.00	1100.00
I-Pump-1	Minerva PS	0.00	940.00	

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
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES .....(P) = 207
NUMBER OF END NODES .....(J) = 191
NUMBER OF PRIMARY LOOPS .....(L) = 12
NUMBER OF SUPPLY NODES .....(F) = 5
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 12 TRIALS: ACCURACY = 0.14084E-05

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)

Bracken Co. Water District/Wester Mason Water District
Partial System Map
Case 0 - Average Usage
Case 1 - Flushing Velocity

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
2	1	27	3.35	0.00	0.00	0.04	0.00	0.00
3	3	28	3.35	0.03	0.00	0.09	0.01	0.01
4	2	4	4.25	0.01	0.00	0.05	0.00	0.00
5	2	31	-3.90	0.01	0.00	0.04	0.00	0.00
6	5	20	-18.92	0.01	0.00	0.12	0.01	0.01
7	6	26	3.35	0.05	0.00	0.09	0.01	0.01
8	4	7	4.25	0.04	0.00	0.11	0.02	0.02
9	7	30	4.25	0.08	0.00	0.11	0.02	0.02
10	9	25	-12.02	0.05	0.00	0.14	0.02	0.02
11	5	21	12.02	0.01	0.00	0.08	0.01	0.01
12	9	11	13.26	0.01	0.00	0.08	0.01	0.01
13	11	10	5.00	0.01	0.00	0.03	0.00	0.00
14	11	34	8.26	0.25	0.00	0.21	0.07	0.07
15	13	37	-2.53	0.03	0.00	0.06	0.01	0.01
16	14	13	8.26	0.34	0.00	0.21	0.07	0.07
17	12	40	-34.71	0.84	0.00	0.39	0.15	0.15
18	15	T-2	-75.74	0.03	0.00	0.48	0.15	0.15
19	16	6	24.26	0.03	0.00	0.15	0.02	0.02
20	17	6	-18.92	0.04	0.00	0.12	0.01	0.01
21	18	17	-18.92	0.06	0.00	0.12	0.01	0.01
22	19	18	-18.92	0.04	0.00	0.12	0.01	0.01
23	20	19	-18.92	0.03	0.00	0.12	0.01	0.01
24	21	22	12.02	0.01	0.00	0.08	0.01	0.01
25	22	8	12.02	0.01	0.00	0.08	0.01	0.01
26	23	8	-12.02	0.07	0.00	0.14	0.02	0.02
27	24	23	-12.02	0.05	0.00	0.14	0.02	0.02

28	25	24	-12.02	0.05	0.00	0.14	0.02	0.02
29	26	1	3.35	0.06	0.00	0.09	0.01	0.01
30	27	3	3.35	0.01	0.00	0.04	0.00	0.00
31	28	29	3.35	0.03	0.00	0.09	0.01	0.01
32	29	2	3.35	0.02	0.00	0.09	0.01	0.01
33	30	9	4.25	0.08	0.00	0.11	0.02	0.02
34	31	32	-3.90	0.00	0.00	0.04	0.00	0.00
35	32	33	-3.90	0.02	0.00	0.04	0.00	0.00
36	33	5	-3.90	0.01	0.00	0.04	0.00	0.00
37	34	35	8.26	0.30	0.00	0.21	0.07	0.07
38	35	36	8.26	0.47	0.00	0.21	0.07	0.07
39	36	14	8.26	0.37	0.00	0.21	0.07	0.07
40	37	38	-2.53	0.03	0.00	0.06	0.01	0.01
41	38	39	-5.53	0.13	0.00	0.14	0.04	0.04
42	39	12	-5.53	0.09	0.00	0.14	0.04	0.04
43	40	41	-34.71	0.29	0.00	0.39	0.15	0.15
44	41	42	-34.71	0.38	0.00	0.39	0.15	0.15
45	42	15	-34.71	0.35	0.00	0.39	0.15	0.15
46	15	98	36.02	0.02	0.00	0.23	0.04	0.04
47	43	127	14.02	0.07	0.00	0.09	0.01	0.01
48	44	88	-1.90	0.00	0.00	0.02	0.00	0.00
49	46	67	-28.00	0.08	0.00	0.32	0.10	0.10
50	48	75	5.00	0.00	0.00	0.03	0.00	0.00
51	47	54	-6.64	0.29	0.00	0.17	0.05	0.05
52	47	49	4.64	0.00	0.00	0.03	0.00	0.00
53	50	51	0.00	0.00	0.00	0.00	0.00	0.00
54	50	T-3	0.00	0.00	0.00	0.00	0.00	0.00
55	49	77	0.00	0.00	0.00	0.00	0.00	0.00
56	52	82	5.36	0.07	0.00	0.14	0.03	0.03
57	52	53	-5.17	0.01	0.00	0.13	0.03	0.03
58	54	52	0.19	0.00	0.00	0.00	0.00	0.00
59	54	53	-6.83	0.01	0.00	0.08	0.01	0.01
60	53	55	-15.00	0.10	0.00	0.17	0.03	0.03
61	55	56	0.00	0.00	0.00	0.00	0.00	0.00
62	55	T-4	-38.00	0.03	0.00	0.43	0.17	0.17
63	48	T-5	-68.00	0.05	0.00	0.43	0.13	0.13
64	48	74	8.00	0.73	0.00	0.36	0.28	0.28
65-XXCV	47	58						
66	58	76	3.00	0.81	0.00	0.31	0.33	0.33
67	59	68	-48.43	0.06	0.00	0.31	0.07	0.07
68	59	72	2.00	0.00	0.00	0.02	0.00	0.00
69	61	59	-36.43	0.04	0.00	0.23	0.04	0.04
70	61	66	5.00	0.02	0.00	0.06	0.00	0.00
71	63	71	5.00	0.23	0.00	0.23	0.12	0.12
72	63	65	0.00	0.00	0.00	0.00	0.00	0.00
73	66	63	5.00	0.19	0.00	0.23	0.12	0.12
74	61	68	-6.57	0.10	0.00	0.17	0.05	0.05
75	68	73	-55.00	0.09	0.00	0.35	0.08	0.08
76	67	61	-28.00	0.07	0.00	0.18	0.02	0.02
77	69	70	-17.85	0.07	0.00	0.20	0.04	0.04
78	70	86	-17.85	0.09	0.00	0.20	0.04	0.04
79	71	64	5.00	0.25	0.00	0.23	0.12	0.12
80	72	62	2.00	0.00	0.00	0.02	0.00	0.00
81	73	48	-55.00	0.37	0.00	0.35	0.08	0.08
82	74	57	5.00	1.08	0.00	0.23	0.12	0.12
83	75	58	3.00	0.00	0.00	0.02	0.00	0.00
84	76	60	3.00	1.20	0.00	0.31	0.33	0.33
85	77	79	0.00	0.00	0.00	0.00	0.00	0.00
86	78	80	0.00	0.00	0.00	0.00	0.00	0.00
87	79	78	0.00	0.00	0.00	0.00	0.00	0.00
88	80	81	0.00	0.00	0.00	0.00	0.00	0.00
89	81	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
90	82	83	5.36	0.06	0.00	0.14	0.03	0.03
91	83	84	5.36	0.06	0.00	0.14	0.03	0.03
92	84	85	5.36	0.02	0.00	0.14	0.03	0.03
93	85	49	5.36	0.08	0.00	0.14	0.03	0.03
94	86	45	-23.00	0.05	0.00	0.26	0.07	0.07
95	86	87	5.15	0.10	0.00	0.13	0.03	0.03
96	88	166	-9.85	0.01	0.00	0.11	0.01	0.01
97	88	96	-2.05	0.02	0.00	0.05	0.01	0.01
98	87	118	0.00	0.00	0.00	0.00	0.00	0.00
99	90	89	-7.00	0.19	0.00	0.18	0.05	0.05
100	90	119	2.00	0.09	0.00	0.09	0.02	0.02
101	89	94	-7.00	1.70	0.00	0.32	0.22	0.22
102	91	93	0.00	0.00	0.00	0.00	0.00	0.00
103	91	95	-7.00	0.38	0.00	0.32	0.22	0.22
104	94	91	-7.00	0.38	0.00	0.32	0.22	0.22
105	94	120	0.00	0.00	0.00	0.00	0.00	0.00
106	96	87	-5.15	0.10	0.00	0.13	0.03	0.03
107	96	97	3.10	0.02	0.00	0.08	0.01	0.01
108	97	113	-1.90	0.00	0.00	0.01	0.00	0.00
109	95	122	-12.00	0.07	0.00	0.14	0.02	0.02
110	98	43	14.02	0.01	0.00	0.09	0.01	0.01
111	99	104	-22.00	0.03	0.00	0.14	0.02	0.02
112	100	101	-12.00	0.01	0.00	0.14	0.02	0.02
113	100	102	0.00	0.00	0.00	0.00	0.00	0.00
114	101	126	-12.00	0.04	0.00	0.14	0.02	0.02
115	101	103	0.00	0.00	0.00	0.00	0.00	0.00
116	104	98	-22.00	0.04	0.00	0.14	0.02	0.02
117	104	106	0.00	0.00	0.00	0.00	0.00	0.00

118	99	107	0.00	0.00	0.00	0.00	0.00	0.00
119	107	105	0.00	0.00	0.00	0.00	0.00	0.00
120	107	109	0.00	0.00	0.00	0.00	0.00	0.00
121-XX	108	110						
122	108	111	0.00	0.00	0.00	0.00	0.00	0.00
123	110	97	-5.00	0.01	0.00	0.03	0.00	0.00
124	110	112	0.00	0.00	0.00	0.00	0.00	0.00
125	113	115	-1.90	0.00	0.00	0.01	0.00	0.00
126	113	114	0.00	0.00	0.00	0.00	0.00	0.00
127	115	117	-1.90	0.00	0.00	0.01	0.00	0.00
128	115	116	0.00	0.00	0.00	0.00	0.00	0.00
129	117	44	-1.90	0.00	0.00	0.01	0.00	0.00
130-XX	118	90						
131	119	92	2.00	0.05	0.00	0.09	0.02	0.02
132	120	121	0.00	0.00	0.00	0.00	0.00	0.00
133	121	108	0.00	0.00	0.00	0.00	0.00	0.00
134	122	123	-12.00	0.04	0.00	0.14	0.02	0.02
135	123	124	-12.00	0.10	0.00	0.14	0.02	0.02
136	124	125	-12.00	0.06	0.00	0.14	0.02	0.02
137	125	100	-12.00	0.01	0.00	0.14	0.02	0.02
138	126	99	-22.00	0.07	0.00	0.25	0.06	0.06
139	127	165	14.02	0.00	0.00	0.09	0.01	0.01
140	I-Pump-1	50	0.00	0.00	0.00	0.00	0.00	0.00
141	52	128	0.00	0.00	0.00	0.00	0.00	0.00
142	55	129	23.00	0.10	0.00	0.26	0.07	0.07
143	129	133	23.00	0.02	0.00	0.26	0.07	0.07
144	129	131	0.00	0.00	0.00	0.00	0.00	0.00
145	132	145	13.00	0.10	0.00	0.15	0.02	0.02
146	132	134	0.00	0.00	0.00	0.00	0.00	0.00
147	133	136	11.20	0.02	0.00	0.13	0.02	0.02
148	133	136	1.80	0.02	0.00	0.08	0.02	0.02
149	136	132	13.00	0.01	0.00	0.15	0.02	0.02
150	130	135	0.00	0.00	0.00	0.00	0.00	0.00
151	130	137	0.00	0.00	0.00	0.00	0.00	0.00
152	138	130	0.00	0.00	0.00	0.00	0.00	0.00
153	138	140	0.00	0.00	0.00	0.00	0.00	0.00
154	139	154	5.00	0.02	0.00	0.06	0.00	0.00
155	139	141	3.00	0.02	0.00	0.08	0.01	0.01
156	141	153	3.00	0.04	0.00	0.08	0.01	0.01
157	141	144	0.00	0.00	0.00	0.00	0.00	0.00
158	142	143	3.00	0.07	0.00	0.08	0.01	0.01
159	145	146	13.00	0.03	0.00	0.15	0.02	0.02
160	146	147	13.00	0.02	0.00	0.15	0.02	0.02
161	147	148	13.00	0.04	0.00	0.15	0.02	0.02
162	148	149	13.00	0.05	0.00	0.15	0.02	0.02
163	149	150	13.00	0.02	0.00	0.15	0.02	0.02
164	150	151	13.00	0.05	0.00	0.15	0.02	0.02
165	151	152	13.00	0.03	0.00	0.15	0.02	0.02
166	152	139	13.00	0.04	0.00	0.15	0.02	0.02
167	153	142	3.00	0.04	0.00	0.08	0.01	0.01
168	154	155	5.00	0.01	0.00	0.06	0.00	0.00
169	155	138	5.00	0.01	0.00	0.06	0.00	0.00
170	12	186	19.18	0.11	0.00	0.22	0.05	0.05
171	156	159	2.00	0.02	0.00	0.05	0.01	0.01
172	156	160	0.00	0.00	0.00	0.00	0.00	0.00
173	157	179	5.00	0.01	0.00	0.06	0.00	0.00
174	159	158	2.00	0.01	0.00	0.05	0.01	0.01
175	157	180	-0.80	0.00	0.00	0.02	0.00	0.00
176	161	164	23.20	0.35	0.00	0.26	0.07	0.07
177	162	187	-9.02	0.12	0.00	0.23	0.09	0.09
178	163	161	28.20	0.04	0.00	0.32	0.10	0.10
179	163	162	-9.02	0.00	0.00	0.10	0.01	0.01
180-XX	165	44						
181	164	157	4.20	0.00	0.00	0.05	0.00	0.00
182	164	178	9.00	0.41	0.00	0.23	0.09	0.09
183	166	69	-17.85	0.05	0.00	0.20	0.04	0.04
184	166	168	8.00	0.26	0.00	0.20	0.07	0.07
185	168	170	8.00	0.36	0.00	0.20	0.07	0.07
186	170	171	3.00	0.04	0.00	0.08	0.01	0.01
187	171	169	3.00	0.03	0.00	0.08	0.01	0.01
188	172	173	7.00	0.17	0.00	0.18	0.05	0.05
189	173	174	7.00	0.31	0.00	0.18	0.05	0.05
190	174	175	2.00	0.04	0.00	0.05	0.01	0.01
191	175	167	2.00	0.01	0.00	0.05	0.01	0.01
192	176	172	7.00	0.16	0.00	0.18	0.05	0.05
193	177	176	7.00	0.09	0.00	0.18	0.05	0.05
194	178	177	9.00	0.16	0.00	0.23	0.09	0.09
195	179	156	5.00	0.01	0.00	0.06	0.00	0.00
196	180	181	-0.80	0.01	0.00	0.02	0.00	0.00
197	181	182	-5.80	0.06	0.00	0.15	0.04	0.04
198	182	183	-5.80	0.05	0.00	0.15	0.04	0.04
199	183	184	-5.80	0.18	0.00	0.15	0.04	0.04
200	184	13	-5.80	0.14	0.00	0.15	0.04	0.04
201	185	163	19.18	0.14	0.00	0.22	0.05	0.05
202	186	185	19.18	0.08	0.00	0.22	0.05	0.05
203	187	188	-9.02	0.33	0.00	0.23	0.09	0.09
204	188	189	-14.02	0.43	0.00	0.36	0.20	0.20
205	189	190	-14.02	0.48	0.00	0.36	0.20	0.20
206	190	165	-14.02	0.74	0.00	0.36	0.20	0.20
207	46	45	26.00	0.12	0.00	0.30	0.09	0.09

P-1	T-1	16	24.26	0.00	0.00	0.15	0.02	0.02

PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	108.00	114.57	0.0	75.00	0.	0.0	0.0	**	**	141.2

NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
1		0.00	1099.85	960.00	139.85	60.60
2		3.00	1099.76	960.00	139.76	60.56
3		0.00	1099.84	967.00	132.84	57.56
4		0.00	1099.75	960.00	139.75	60.56
5		3.00	1099.79	881.00	218.79	94.81
6		2.00	1099.96	975.00	124.96	54.15
7		0.00	1099.71	968.00	131.71	57.07
8		0.00	1099.77	900.00	199.77	86.57
9		3.00	1099.55	955.00	144.55	62.64
10		5.00	1099.53	930.00	169.53	73.46
11		0.00	1099.54	946.00	153.54	66.53
12		10.00	1098.10	900.00	198.10	85.84
13		5.00	1097.81	640.00	457.81	198.38
14		0.00	1098.15	802.00	296.15	128.33
15		5.00	1099.97	960.00	139.97	60.65
16		0.00	1100.00	980.00	120.00	52.00
17		0.00	1099.93	939.00	160.93	69.73
18		0.00	1099.87	927.00	172.87	74.91
19		0.00	1099.83	900.00	199.83	86.59
20		0.00	1099.81	720.00	379.81	164.58
21		0.00	1099.78	900.00	199.78	86.57
22		0.00	1099.78	700.00	399.78	173.24
23		0.00	1099.70	920.00	179.70	77.87
24		0.00	1099.66	870.00	229.66	99.52
25		0.00	1099.60	940.00	159.60	69.16
26		0.00	1099.91	973.00	126.91	54.99
27		0.00	1099.85	976.00	123.85	53.67
28		0.00	1099.81	960.00	139.81	60.59
29		0.00	1099.78	950.00	149.78	64.90
30		0.00	1099.63	943.00	156.63	67.87
31		0.00	1099.77	910.00	189.77	82.23
32		0.00	1099.77	934.00	165.77	71.83
33		0.00	1099.79	900.00	199.79	86.57
34		0.00	1099.29	900.00	199.29	86.36
35		0.00	1098.98	900.00	198.98	86.22
36		0.00	1098.51	875.00	223.51	96.85
37		0.00	1097.84	820.00	277.84	120.40
38		3.00	1097.87	880.00	217.87	94.41
39		0.00	1098.01	908.00	190.01	82.34
40		0.00	1098.94	920.00	178.94	77.54
41		0.00	1099.23	936.00	163.23	70.73
42		0.00	1099.62	958.00	141.62	61.37
43		0.00	1099.94	940.00	159.94	69.31
44		0.00	1098.84	980.00	118.84	51.50
45		3.00	1099.11	940.00	159.11	68.95
46		2.00	1099.23	950.00	149.23	64.67
47		2.00	1054.57	944.00	110.57	47.91
48		0.00	1099.95	977.00	122.95	53.28
49		10.00	1054.57	962.00	92.57	40.11
50		0.00	1048.00	940.00	108.00	46.80
51		0.00	1048.00	950.00	98.00	42.47
52		0.00	1054.86	892.00	162.86	70.57
53		3.00	1054.87	890.00	164.87	71.44
54		0.00	1054.86	940.00	114.86	49.77
55		0.00	1054.97	960.00	94.97	41.15
56		0.00	1054.97	960.00	94.97	41.15
57		5.00	1098.14	920.00	178.14	77.19
58		0.00	1099.95	946.00	153.95	66.71
59		10.00	1099.43	970.00	129.43	56.08
60		3.00	1097.94	939.00	158.94	68.87
61		10.00	1099.39	970.00	129.39	56.07
62		2.00	1099.42	917.00	182.42	79.05
63		0.00	1099.18	951.00	148.18	64.21
64		5.00	1098.69	960.00	138.69	60.10
65		0.00	1099.18	940.00	159.18	68.98
66		0.00	1099.37	933.00	166.37	72.09
67		0.00	1099.31	967.00	132.31	57.34

68	0.00	1099.48	970.00	129.48	56.11
69	0.00	1098.90	945.00	153.90	66.69
70	0.00	1098.96	980.00	118.96	51.55
71	0.00	1098.94	965.00	133.94	58.04
72	0.00	1099.43	965.00	134.43	58.25
73	0.00	1099.58	960.00	139.58	60.48
74	3.00	1099.22	957.00	142.22	61.63
75	2.00	1099.95	963.00	136.95	59.34
76	0.00	1099.14	936.00	163.14	70.69
77	0.00	1054.57	912.00	142.57	61.78
78	0.00	1054.57	910.00	144.57	62.65
79	0.00	1054.57	943.00	111.57	48.35
80	0.00	1054.57	944.00	110.57	47.91
81	0.00	1054.57	937.00	117.57	50.95
82	0.00	1054.79	940.00	114.79	49.74
83	0.00	1054.73	850.00	204.73	88.72
84	0.00	1054.67	930.00	124.67	54.02
85	0.00	1054.64	890.00	164.64	71.35
86	0.00	1099.05	960.00	139.05	60.26
87	0.00	1098.95	980.00	118.95	51.55
88	10.00	1098.84	940.00	158.84	68.83
89	0.00	1097.03	937.00	160.03	69.35
90	5.00	1096.84	950.00	146.84	63.63
91	0.00	1099.11	912.00	187.11	81.08
92	2.00	1096.70	920.00	176.70	76.57
93	0.00	1099.11	910.00	189.11	81.95
94	0.00	1098.73	920.00	178.73	77.45
95	5.00	1099.49	920.00	179.49	77.78
96	0.00	1098.85	880.00	218.85	94.84
97	0.00	1098.84	900.00	198.84	86.16
98	0.00	1099.95	962.00	137.95	59.78
99	0.00	1099.88	945.00	154.88	67.11
100	0.00	1099.77	940.00	159.77	69.23
101	0.00	1099.78	960.00	139.78	60.57
102	0.00	1099.77	940.00	159.77	69.23
103	0.00	1099.78	940.00	159.78	69.24
104	0.00	1099.91	959.00	140.91	61.06
105	0.00	1099.88	940.00	159.88	69.28
106	0.00	1099.91	950.00	149.91	64.96
107	0.00	1099.88	940.00	159.88	69.28
108	0.00	1098.73	920.00	178.73	77.45
109	0.00	1099.88	920.00	179.88	77.95
110	5.00	1098.83	942.00	156.83	67.96
111	0.00	1098.73	920.00	178.73	77.45
112	0.00	1098.83	920.00	178.83	77.49
113	0.00	1098.84	960.00	138.84	60.16
114	0.00	1098.84	960.00	138.84	60.16
115	0.00	1098.84	950.00	148.84	64.50
116	0.00	1098.84	960.00	138.84	60.16
117	0.00	1098.84	967.00	131.84	57.13
118	0.00	1098.95	957.00	141.95	61.51
119	0.00	1096.75	960.00	136.75	59.26
120	0.00	1098.73	770.00	328.73	142.45
121	0.00	1098.73	920.00	178.73	77.45
122	0.00	1099.56	730.00	369.56	160.14
123	0.00	1099.59	920.00	179.59	77.82
124	0.00	1099.70	940.00	159.70	69.20
125	0.00	1099.75	970.00	129.75	56.23
126	10.00	1099.81	940.00	159.81	69.25
127	0.00	1099.88	949.00	150.88	65.38
128	0.00	1054.86	900.00	154.86	67.10
129	0.00	1054.87	940.00	114.87	49.78
130	0.00	1054.40	893.00	161.40	69.94
131	0.00	1054.87	950.00	104.87	45.44
132	0.00	1054.82	940.00	114.82	49.76
133	10.00	1054.85	930.00	124.85	54.10
134	0.00	1054.82	940.00	114.82	49.76
135	0.00	1054.40	880.00	174.40	75.58
136	0.00	1054.83	930.00	124.83	54.09
137	0.00	1054.40	900.00	154.40	66.91
138	5.00	1054.40	900.00	154.40	66.91
139	5.00	1054.45	872.00	182.45	79.06
140	0.00	1054.40	900.00	154.40	66.91
141	0.00	1054.42	930.00	124.42	53.92
142	0.00	1054.34	910.00	144.34	62.55
143	3.00	1054.27	500.00	554.27	240.18
144	0.00	1054.42	850.00	204.42	88.58
145	0.00	1054.73	865.00	189.73	82.22
146	0.00	1054.70	920.00	134.70	58.37
147	0.00	1054.68	880.00	174.68	75.70
148	0.00	1054.64	920.00	134.64	58.35
149	0.00	1054.59	940.00	114.59	49.66
150	0.00	1054.57	940.00	114.57	49.65
151	0.00	1054.52	890.00	164.52	71.29
152	0.00	1054.48	930.00	124.48	53.94
153	0.00	1054.38	900.00	154.38	66.90
154	0.00	1054.43	915.00	139.43	60.42
155	0.00	1054.42	900.00	154.42	66.91
156	3.00	1097.36	900.00	197.36	85.52
157	0.00	1097.38	919.00	178.38	77.30

158		2.00	1097.33	653.00	444.33	192.54
159		0.00	1097.34	831.00	266.34	115.41
160		0.00	1097.36	920.00	177.36	76.85
161		5.00	1097.73	898.00	199.73	86.55
162		0.00	1097.77	890.00	207.77	90.03
163		0.00	1097.76	900.00	197.76	85.70
164		10.00	1097.38	921.00	176.38	76.43
165		0.00	1099.88	950.00	149.88	64.95
166		0.00	1098.85	940.00	158.85	68.83
167		2.00	1096.03	640.00	456.03	197.61
168		0.00	1098.59	960.00	138.59	60.05
169		3.00	1098.15	800.00	298.15	129.20
170		5.00	1098.23	950.00	148.23	64.23
171		0.00	1098.19	750.00	348.19	150.88
172		0.00	1096.56	960.00	136.56	59.18
173		0.00	1096.39	942.00	154.39	66.90
174		5.00	1096.08	922.00	174.08	75.43
175		0.00	1096.04	860.00	236.04	102.28
176		0.00	1096.72	933.00	163.72	70.95
177		2.00	1096.81	945.00	151.81	65.79
178		0.00	1096.98	920.00	176.98	76.69
179		0.00	1097.37	900.00	197.37	85.53
180		0.00	1097.38	905.00	192.38	83.37
181		5.00	1097.39	810.00	287.39	124.53
182		0.00	1097.45	860.00	237.45	102.89
183		0.00	1097.49	800.00	297.49	128.91
184		0.00	1097.67			
185		0.00	1097.90	700.00	397.90	172.42
186		0.00	1097.99	900.00	197.99	85.79
187		0.00	1097.89	710.00	387.89	168.09
188		5.00	1098.22	790.00	308.22	133.56
189		0.00	1098.66	930.00	168.66	73.08
190		0.00	1099.13	949.00	150.13	65.06
O-Pump-1	Minerva PS	0.00	1054.57	940.00	114.57	49.65
T-1	Berlin Tank	----	1100.00	980.00	120.00	52.00
T-2	Perina Tank	----	1100.00	960.00	140.00	60.67
T-3	Minerva Tank	----	1048.00	940.00	108.00	46.80
T-4	Highland Tan	----	1055.00	960.00	95.00	41.17
T-5	German Town	----	1100.00	980.00	120.00	52.00
I-Pump-1	Minerva PS	0.00	1048.00	940.00	108.00	46.80

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
143	240.18	49	40.11
13	198.38	55	41.15
167	197.61	56	41.15
158	192.54	T-4	41.17
22	173.24	51	42.47

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
18	0.48	58	0.00
63	0.43	108	0.01
62	0.43	125	0.01
17	0.39	127	0.01
43	0.39	129	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
66	0.33	58	0.00
84	0.33	125	0.00
64	0.28	127	0.00
101	0.22	129	0.00
103	0.22	108	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
66	0.33	58	0.00
84	0.33	125	0.00

64	0.28	127	0.00
101	0.22	129	0.00
103	0.22	108	0.00

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 SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
T-1	24.26	Berlin Tank
T-2	75.74	Perina Tank
T-3	0.00	Minerva Tank
T-4	38.00	Highland Tan
T-5	68.00	German Town

NET SYSTEM INFLOW = 206.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 206.00

==========

Case: 1

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 1)

Demand added to end of new extension (J-45) to show flushing velocity of 2.5 fps

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 121 is OPENED
Pipe 130 is OPENED
Pipe 180 is OPENED
Pipe 94 is CLOSED

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.44613E-04

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
2	1	27	3.38	0.00	0.00	0.04	0.00	0.00
3	3	28	3.38	0.03	0.00	0.09	0.01	0.01
4	2	4	4.31	0.01	0.00	0.05	0.00	0.00
5	2	31	-3.93	0.01	0.00	0.04	0.00	0.00
6	5	20	-19.12	0.01	0.00	0.12	0.01	0.01
7	6	26	3.38	0.05	0.00	0.09	0.02	0.02
8	4	7	4.31	0.04	0.00	0.11	0.02	0.02
9	7	30	4.31	0.08	0.00	0.11	0.02	0.02
10	9	25	-12.19	0.05	0.00	0.14	0.02	0.02
11	5	21	12.19	0.01	0.00	0.08	0.01	0.01
12	9	11	13.50	0.01	0.00	0.09	0.01	0.01
13	11	10	5.00	0.01	0.00	0.03	0.00	0.00
14	11	34	8.50	0.27	0.00	0.22	0.08	0.08
15	13	37	-2.49	0.03	0.00	0.06	0.01	0.01
16	14	13	8.50	0.35	0.00	0.22	0.08	0.08
17	12	40	-35.62	0.88	0.00	0.40	0.15	0.15
18	15	T-2	-98.50	0.05	0.00	0.63	0.25	0.25
19	16	6	24.50	0.03	0.00	0.16	0.02	0.02
20	17	6	-19.12	0.04	0.00	0.12	0.01	0.01
21	18	17	-19.12	0.06	0.00	0.12	0.01	0.01
22	19	18	-19.12	0.04	0.00	0.12	0.01	0.01
23	20	19	-19.12	0.03	0.00	0.12	0.01	0.01
24	21	22	12.19	0.01	0.00	0.08	0.01	0.01
25	22	8	12.19	0.01	0.00	0.08	0.01	0.01
26	23	8	-12.19	0.07	0.00	0.14	0.02	0.02
27	24	23	-12.19	0.05	0.00	0.14	0.02	0.02
28	25	24	-12.19	0.06	0.00	0.14	0.02	0.02
29	26	1	3.38	0.06	0.00	0.09	0.02	0.02
30	27	3	3.38	0.01	0.00	0.04	0.00	0.00
31	28	29	3.38	0.03	0.00	0.09	0.01	0.01
32	29	2	3.38	0.02	0.00	0.09	0.01	0.01
33	30	9	4.31	0.08	0.00	0.11	0.02	0.02
34	31	32	-3.93	0.00	0.00	0.04	0.00	0.00
35	32	33	-3.93	0.02	0.00	0.04	0.00	0.00
36	33	5	-3.93	0.01	0.00	0.04	0.00	0.00
37	34	35	8.50	0.32	0.00	0.22	0.08	0.08

38	35	36	8.50	0.50	0.00	0.22	0.08	0.08
39	36	14	8.50	0.38	0.00	0.22	0.08	0.08
40	37	38	-2.49	0.03	0.00	0.06	0.01	0.01
41	38	39	-5.49	0.13	0.00	0.14	0.03	0.03
42	39	12	-5.49	0.09	0.00	0.14	0.03	0.03
43	40	41	-35.62	0.31	0.00	0.40	0.15	0.15
44	41	42	-35.62	0.40	0.00	0.40	0.15	0.15
45	42	15	-35.62	0.37	0.00	0.40	0.15	0.15
46	15	98	57.88	0.04	0.00	0.37	0.09	0.09
47	43	127	38.80	0.44	0.00	0.25	0.04	0.04
48	44	88	19.62	0.02	0.00	0.22	0.05	0.05
49	46	67	-222.00	3.82	0.00	2.52	4.57	4.57
50	48	75	5.00	0.00	0.00	0.03	0.00	0.00
51	47	54	-6.64	0.29	0.00	0.17	0.05	0.05
52	47	49	4.64	0.00	0.00	0.03	0.00	0.00
53	50	51	0.00	0.00	0.00	0.00	0.00	0.00
54	50	T-3	0.00	0.00	0.00	0.00	0.00	0.00
55	49	77	0.00	0.00	0.00	0.00	0.00	0.00
56	52	82	5.36	0.07	0.00	0.14	0.03	0.03
57	52	53	-5.17	0.01	0.00	0.13	0.03	0.03
58	54	52	0.19	0.00	0.00	0.00	0.00	0.00
59	54	53	-6.83	0.01	0.00	0.08	0.01	0.01
60	53	55	-15.00	0.10	0.00	0.17	0.03	0.03
61	55	56	0.00	0.00	0.00	0.00	0.00	0.00
62	55	T-4	-38.00	0.03	0.00	0.43	0.17	0.17
63	48	T-5	-262.00	0.61	0.00	1.67	1.53	1.53
64	48	74	8.00	0.73	0.00	0.36	0.28	0.28
65-XXCV	47	58						
66	58	76	3.00	0.81	0.00	0.31	0.33	0.33
67	59	68	-216.29	0.90	0.00	1.38	1.07	1.07
68	59	72	2.00	0.00	0.00	0.02	0.00	0.00
69	61	59	-204.29	1.01	0.00	1.30	0.96	0.96
70	61	66	5.00	0.02	0.00	0.06	0.00	0.00
71	63	71	5.00	0.23	0.00	0.23	0.12	0.12
72	63	65	0.00	0.00	0.00	0.00	0.00	0.00
73	66	63	5.00	0.19	0.00	0.23	0.12	0.12
74	61	68	-32.71	1.90	0.00	0.84	0.95	0.95
75	68	73	-249.00	1.55	0.00	1.59	1.39	1.39
76	67	61	-222.00	3.30	0.00	1.42	1.12	1.12
77	69	70	1.94	0.00	0.00	0.02	0.00	0.00
78	70	86	1.94	0.00	0.00	0.02	0.00	0.00
79	71	64	5.00	0.25	0.00	0.23	0.12	0.12
80	72	62	2.00	0.00	0.00	0.02	0.00	0.00
81	73	48	-249.00	6.11	0.00	1.59	1.39	1.39
82	74	57	5.00	1.08	0.00	0.23	0.12	0.12
83	75	58	3.00	0.00	0.00	0.02	0.00	0.00
84	76	60	3.00	1.20	0.00	0.31	0.33	0.33
85	77	79	0.00	0.00	0.00	0.00	0.00	0.00
86	78	80	0.00	0.00	0.00	0.00	0.00	0.00
87	79	78	0.00	0.00	0.00	0.00	0.00	0.00
88	80	81	0.00	0.00	0.00	0.00	0.00	0.00
89	81	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
90	82	83	5.36	0.06	0.00	0.14	0.03	0.03
91	83	84	5.36	0.06	0.00	0.14	0.03	0.03
92	84	85	5.36	0.02	0.00	0.14	0.03	0.03
93	85	49	5.36	0.08	0.00	0.14	0.03	0.03
94-XX	86	45						
95	86	87	1.94	0.02	0.00	0.05	0.01	0.01
96	88	166	9.94	0.01	0.00	0.11	0.01	0.01
97	88	96	-0.32	0.00	0.00	0.01	0.00	0.00
98	87	118	4.54	0.11	0.00	0.12	0.02	0.02
99	90	89	-2.46	0.03	0.00	0.06	0.01	0.01
100	90	119	2.00	0.09	0.00	0.09	0.02	0.02
101	89	94	-2.46	0.24	0.00	0.11	0.03	0.03
102	91	93	0.00	0.00	0.00	0.00	0.00	0.00
103	91	95	-4.08	0.14	0.00	0.19	0.08	0.08
104	94	91	-4.08	0.14	0.00	0.19	0.08	0.08
105	94	120	1.62	0.00	0.00	0.01	0.00	0.00
106	96	87	2.60	0.03	0.00	0.07	0.01	0.01
107	96	97	-2.92	0.02	0.00	0.07	0.01	0.01
108	97	113	-6.30	0.00	0.00	0.04	0.00	0.00
109	95	122	-9.08	0.04	0.00	0.10	0.01	0.01
110	98	43	38.80	0.06	0.00	0.25	0.04	0.04
111	99	104	-19.08	0.03	0.00	0.12	0.01	0.01
112	100	101	-9.08	0.00	0.00	0.10	0.01	0.01
113	100	102	0.00	0.00	0.00	0.00	0.00	0.00
114	101	126	-9.08	0.02	0.00	0.10	0.01	0.01
115	101	103	0.00	0.00	0.00	0.00	0.00	0.00
116	104	98	-19.08	0.03	0.00	0.12	0.01	0.01
117	104	106	0.00	0.00	0.00	0.00	0.00	0.00
118	99	107	0.00	0.00	0.00	0.00	0.00	0.00
119	107	105	0.00	0.00	0.00	0.00	0.00	0.00
120	107	109	0.00	0.00	0.00	0.00	0.00	0.00
121	108	110	1.62	0.00	0.00	0.01	0.00	0.00
122	108	111	0.00	0.00	0.00	0.00	0.00	0.00
123	110	97	-3.38	0.00	0.00	0.02	0.00	0.00
124	110	112	0.00	0.00	0.00	0.00	0.00	0.00
125	113	115	-6.30	0.00	0.00	0.04	0.00	0.00
126	113	114	0.00	0.00	0.00	0.00	0.00	0.00
127	115	117	-6.30	0.00	0.00	0.04	0.00	0.00

128	115	116	0.00	0.00	0.00	0.00	0.00	0.00
129	117	44	-6.30	0.00	0.00	0.04	0.00	0.00
130	118	90	4.54	0.12	0.00	0.12	0.02	0.02
131	119	92	2.00	0.05	0.00	0.09	0.02	0.02
132	120	121	1.62	0.00	0.00	0.01	0.00	0.00
133	121	108	1.62	0.00	0.00	0.01	0.00	0.00
134	122	123	-9.08	0.02	0.00	0.10	0.01	0.01
135	123	124	-9.08	0.06	0.00	0.10	0.01	0.01
136	124	125	-9.08	0.04	0.00	0.10	0.01	0.01
137	125	100	-9.08	0.01	0.00	0.10	0.01	0.01
138	126	99	-19.08	0.05	0.00	0.22	0.05	0.05
139	127	165	38.80	0.02	0.00	0.25	0.04	0.04
140	I-Pump-1	50	0.00	0.00	0.00	0.00	0.00	0.00
141	52	128	0.00	0.00	0.00	0.00	0.00	0.00
142	55	129	23.00	0.10	0.00	0.26	0.07	0.07
143	129	133	23.00	0.02	0.00	0.26	0.07	0.07
144	129	131	0.00	0.00	0.00	0.00	0.00	0.00
145	132	145	13.00	0.10	0.00	0.15	0.02	0.02
146	132	134	0.00	0.00	0.00	0.00	0.00	0.00
147	133	136	11.20	0.02	0.00	0.13	0.02	0.02
148	133	136	1.80	0.02	0.00	0.08	0.02	0.02
149	136	132	13.00	0.01	0.00	0.15	0.02	0.02
150	130	135	0.00	0.00	0.00	0.00	0.00	0.00
151	130	137	0.00	0.00	0.00	0.00	0.00	0.00
152	138	130	0.00	0.00	0.00	0.00	0.00	0.00
153	138	140	0.00	0.00	0.00	0.00	0.00	0.00
154	139	154	5.00	0.02	0.00	0.06	0.00	0.00
155	139	141	3.00	0.02	0.00	0.08	0.01	0.01
156	141	153	3.00	0.04	0.00	0.08	0.01	0.01
157	141	144	0.00	0.00	0.00	0.00	0.00	0.00
158	142	143	3.00	0.07	0.00	0.08	0.01	0.01
159	145	146	13.00	0.03	0.00	0.15	0.02	0.02
160	146	147	13.00	0.02	0.00	0.15	0.02	0.02
161	147	148	13.00	0.04	0.00	0.15	0.02	0.02
162	148	149	13.00	0.05	0.00	0.15	0.02	0.02
163	149	150	13.00	0.02	0.00	0.15	0.02	0.02
164	150	151	13.00	0.05	0.00	0.15	0.02	0.02
165	151	152	13.00	0.03	0.00	0.15	0.02	0.02
166	152	139	13.00	0.04	0.00	0.15	0.02	0.02
167	153	142	3.00	0.04	0.00	0.08	0.01	0.01
168	154	155	5.00	0.01	0.00	0.06	0.00	0.00
169	155	138	5.00	0.01	0.00	0.06	0.00	0.00
170	12	186	20.13	0.13	0.00	0.23	0.05	0.05
171	156	159	2.00	0.02	0.00	0.05	0.01	0.01
172	156	160	0.00	0.00	0.00	0.00	0.00	0.00
173	157	179	5.00	0.01	0.00	0.06	0.00	0.00
174	159	158	2.00	0.01	0.00	0.05	0.01	0.01
175	157	180	-0.99	0.01	0.00	0.03	0.00	0.00
176	161	164	23.01	0.34	0.00	0.26	0.07	0.07
177	162	187	-7.88	0.10	0.00	0.20	0.07	0.07
178	163	161	28.01	0.03	0.00	0.32	0.10	0.10
179	163	162	-7.88	0.00	0.00	0.09	0.01	0.01
180	165	44	25.92	0.05	0.00	0.17	0.02	0.02
181	164	157	4.01	0.00	0.00	0.05	0.00	0.00
182	164	178	9.00	0.41	0.00	0.23	0.09	0.09
183	166	69	1.94	0.00	0.00	0.02	0.00	0.00
184	166	168	8.00	0.26	0.00	0.20	0.07	0.07
185	168	170	8.00	0.36	0.00	0.20	0.07	0.07
186	170	171	3.00	0.04	0.00	0.08	0.01	0.01
187	171	169	3.00	0.03	0.00	0.08	0.01	0.01
188	172	173	7.00	0.17	0.00	0.18	0.05	0.05
189	173	174	7.00	0.31	0.00	0.18	0.05	0.05
190	174	175	2.00	0.04	0.00	0.05	0.01	0.01
191	175	167	2.00	0.01	0.00	0.05	0.01	0.01
192	176	172	7.00	0.16	0.00	0.18	0.05	0.05
193	177	176	7.00	0.09	0.00	0.18	0.05	0.05
194	178	177	9.00	0.16	0.00	0.23	0.09	0.09
195	179	156	5.00	0.01	0.00	0.06	0.00	0.00
196	180	181	-0.99	0.01	0.00	0.03	0.00	0.00
197	181	182	-5.99	0.06	0.00	0.15	0.04	0.04
198	182	183	-5.99	0.05	0.00	0.15	0.04	0.04
199	183	184	-5.99	0.19	0.00	0.15	0.04	0.04
200	184	13	-5.99	0.15	0.00	0.15	0.04	0.04
201	185	163	20.13	0.15	0.00	0.23	0.05	0.05
202	186	185	20.13	0.09	0.00	0.23	0.05	0.05
203	187	188	-7.88	0.26	0.00	0.20	0.07	0.07
204	188	189	-12.88	0.37	0.00	0.33	0.17	0.17
205	189	190	-12.88	0.41	0.00	0.33	0.17	0.17
206	190	165	-12.88	0.63	0.00	0.33	0.17	0.17
207	46	45	220.00	6.44	0.00	2.50	4.49	4.49
P-1	T-1	16	24.50	0.00	0.00	0.16	0.02	0.02

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE	INLET HEAD	OUTLET HEAD	PUMP HEAD	EFFIC-ENCY	USEFUL POWER	INCREMTL COST	TOTAL COST	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail.

	gpm	ft	ft	ft	%	Hp	$	$			ft
Device "Pump-1" is closed											
Pump-1	0.00	108.00	114.57	0.0	75.00	0.	0.0	0.0	**	**	141.2

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
1		0.00	1099.85	960.00	139.85	60.60
2		3.00	1099.75	960.00	139.75	60.56
3		0.00	1099.84	967.00	132.84	57.56
4		0.00	1099.74	960.00	139.74	60.56
5		3.00	1099.79	881.00	218.79	94.81
6		2.00	1099.96	975.00	124.96	54.15
7		0.00	1099.70	968.00	131.70	57.07
8		0.00	1099.76	900.00	199.76	86.56
9		3.00	1099.54	955.00	144.54	62.63
10		5.00	1099.52	930.00	169.52	73.46
11		0.00	1099.53	946.00	153.53	66.53
12		10.00	1097.99	900.00	197.99	85.80
13		5.00	1097.71	640.00	457.71	198.34
14		0.00	1098.06	802.00	296.06	128.29
15		5.00	1099.95	960.00	139.95	60.65
16		0.00	1100.00	980.00	120.00	52.00
17		0.00	1099.92	939.00	160.92	69.73
18		0.00	1099.87	927.00	172.87	74.91
19		0.00	1099.83	900.00	199.83	86.59
20		0.00	1099.80	720.00	379.80	164.58
21		0.00	1099.78	900.00	199.78	86.57
22		0.00	1099.77	700.00	399.77	173.23
23		0.00	1099.70	920.00	179.70	77.87
24		0.00	1099.65	870.00	229.65	99.51
25		0.00	1099.59	940.00	159.59	69.16
26		0.00	1099.91	973.00	126.91	54.99
27		0.00	1099.85	976.00	123.85	53.67
28		0.00	1099.81	960.00	139.81	60.58
29		0.00	1099.78	950.00	149.78	64.90
30		0.00	1099.62	943.00	156.62	67.87
31		0.00	1099.76	910.00	189.76	82.23
32		0.00	1099.76	934.00	165.76	71.83
33		0.00	1099.78	900.00	199.78	86.57
34		0.00	1099.26	900.00	199.26	86.35
35		0.00	1098.94	900.00	198.94	86.21
36		0.00	1098.44	875.00	223.44	96.83
37		0.00	1097.74	820.00	277.74	120.35
38		3.00	1097.77	880.00	217.77	94.37
39		0.00	1097.90	908.00	189.90	82.29
40		0.00	1098.87	920.00	178.87	77.51
41		0.00	1099.18	936.00	163.18	70.71
42		0.00	1099.58	958.00	141.58	61.35
43		0.00	1099.85	940.00	159.85	69.27
44		0.00	1099.34	980.00	119.34	51.71
45		220.00(**)	1076.27	940.00	136.27	59.05
46		2.00	1082.71	950.00	132.71	57.51
47		2.00	1054.57	944.00	110.57	47.91
48		0.00	1099.39	977.00	122.39	53.04
49		10.00	1054.57	962.00	92.57	40.11
50		0.00	1048.00	940.00	108.00	46.80
51		0.00	1048.00	950.00	98.00	42.47
52		0.00	1054.86	892.00	162.86	70.57
53		3.00	1054.87	890.00	164.87	71.44
54		0.00	1054.86	940.00	114.86	49.77
55		0.00	1054.97	960.00	94.97	41.15
56		0.00	1054.97	960.00	94.97	41.15
57		5.00	1097.58	920.00	177.58	76.95
58		0.00	1099.39	946.00	153.39	66.47
59		10.00	1090.84	970.00	120.84	52.36
60		3.00	1097.38	939.00	158.38	68.63
61		10.00	1089.83	970.00	119.83	51.93
62		2.00	1090.83	917.00	173.83	75.33
63		0.00	1089.62	951.00	138.62	60.07
64		5.00	1089.13	960.00	129.13	55.96
65		0.00	1089.62	940.00	149.62	64.84
66		0.00	1089.81	933.00	156.81	67.95
67		0.00	1086.53	967.00	119.53	51.80
68		0.00	1091.73	970.00	121.73	52.75
69		0.00	1099.31	945.00	154.31	66.87
70		0.00	1099.31	980.00	119.31	51.70
71		0.00	1089.39	965.00	124.39	53.90
72		0.00	1090.84	965.00	125.84	54.53
73		0.00	1093.28	960.00	133.28	57.76
74		3.00	1098.66	957.00	141.66	61.39
75		2.00	1099.39	963.00	136.39	59.10
76		0.00	1098.58	936.00	162.58	70.45
77		0.00	1054.57	912.00	142.57	61.78

78	0.00	1054.57	910.00	144.57	62.65
79	0.00	1054.57	943.00	111.57	48.35
80	0.00	1054.57	944.00	110.57	47.91
81	0.00	1054.57	937.00	117.57	50.95
82	0.00	1054.79	940.00	114.79	49.74
83	0.00	1054.73	850.00	204.73	88.72
84	0.00	1054.67	930.00	124.67	54.02
85	0.00	1054.64	890.00	164.64	71.35
86	0.00	1099.31	960.00	139.31	60.37
87	0.00	1099.29	980.00	119.29	51.69
88	10.00	1099.32	940.00	159.32	69.04
89	0.00	1099.09	937.00	162.09	70.24
90	5.00	1099.06	950.00	149.06	64.59
91	0.00	1099.47	912.00	187.47	81.24
92	2.00	1098.92	920.00	178.92	77.53
93	0.00	1099.47	910.00	189.47	82.10
94	0.00	1099.33	920.00	179.33	77.71
95	5.00	1099.61	920.00	179.61	77.83
96	0.00	1099.32	880.00	219.32	95.04
97	0.00	1099.33	900.00	199.33	86.38
98	0.00	1099.91	962.00	137.91	59.76
99	0.00	1099.86	945.00	154.86	67.10
100	0.00	1099.78	940.00	159.78	69.24
101	0.00	1099.78	960.00	139.78	60.57
102	0.00	1099.78	940.00	159.78	69.24
103	0.00	1099.78	940.00	159.78	69.24
104	0.00	1099.88	959.00	140.88	61.05
105	0.00	1099.86	940.00	159.86	69.27
106	0.00	1099.88	950.00	149.88	64.95
107	0.00	1099.86	940.00	159.86	69.27
108	0.00	1099.33	920.00	179.33	77.71
109	0.00	1099.86	920.00	179.86	77.94
110	5.00	1099.33	942.00	157.33	68.18
111	0.00	1099.33	920.00	179.33	77.71
112	0.00	1099.33	920.00	179.33	77.71
113	0.00	1099.34	960.00	139.34	60.38
114	0.00	1099.34	960.00	139.34	60.38
115	0.00	1099.34	950.00	149.34	64.71
116	0.00	1099.34	960.00	139.34	60.38
117	0.00	1099.34	967.00	132.34	57.35
118	0.00	1099.18	957.00	142.18	61.61
119	0.00	1098.97	960.00	138.97	60.22
120	0.00	1099.33	770.00	329.33	142.71
121	0.00	1099.33	920.00	179.33	77.71
122	0.00	1099.65	730.00	369.65	160.18
123	0.00	1099.67	920.00	179.67	77.86
124	0.00	1099.73	940.00	159.73	69.22
125	0.00	1099.77	970.00	129.77	56.23
126	10.00	1099.81	940.00	159.81	69.25
127	0.00	1099.41	949.00	150.41	65.18
128	0.00	1054.86	900.00	154.86	67.10
129	0.00	1054.87	940.00	114.87	49.78
130	0.00	1054.40	893.00	161.40	69.94
131	0.00	1054.87	950.00	104.87	45.44
132	0.00	1054.82	940.00	114.82	49.76
133	10.00	1054.85	930.00	124.85	54.10
134	0.00	1054.82	940.00	114.82	49.76
135	0.00	1054.40	880.00	174.40	75.58
136	0.00	1054.83	930.00	124.83	54.09
137	0.00	1054.40	900.00	154.40	66.91
138	5.00	1054.40	900.00	154.40	66.91
139	5.00	1054.45	872.00	182.45	79.06
140	0.00	1054.40	900.00	154.40	66.91
141	0.00	1054.42	930.00	124.42	53.92
142	0.00	1054.34	910.00	144.34	62.55
143	3.00	1054.27	500.00	554.27	240.18
144	0.00	1054.42	850.00	204.42	88.58
145	0.00	1054.73	865.00	189.73	82.22
146	0.00	1054.70	920.00	134.70	58.37
147	0.00	1054.68	880.00	174.68	75.70
148	0.00	1054.64	920.00	134.64	58.35
149	0.00	1054.59	940.00	114.59	49.66
150	0.00	1054.57	940.00	114.57	49.65
151	0.00	1054.52	890.00	164.52	71.29
152	0.00	1054.48	930.00	124.48	53.94
153	0.00	1054.38	900.00	154.38	66.90
154	0.00	1054.43	915.00	139.43	60.42
155	0.00	1054.42	900.00	154.42	66.91
156	3.00	1097.22	900.00	197.22	85.46
157	0.00	1097.24	919.00	178.24	77.24
158	2.00	1097.19	653.00	444.19	192.48
159	0.00	1097.20	831.00	266.20	115.35
160	0.00	1097.22	920.00	177.22	76.80
161	5.00	1097.59	898.00	199.59	86.49
162	0.00	1097.63	890.00	207.63	89.97
163	0.00	1097.62	900.00	197.62	85.64
164	10.00	1097.25	921.00	176.25	76.37
165	0.00	1099.39	950.00	149.39	64.74
166	0.00	1099.31	940.00	159.31	69.03
167	2.00	1095.89	640.00	455.89	197.55

168		0.00	1099.05	960.00	139.05	60.26
169		3.00	1098.62	800.00	298.62	129.40
170		5.00	1098.69	950.00	148.69	64.43
171		0.00	1098.65	750.00	348.65	151.08
172		0.00	1096.43	960.00	136.43	59.12
173		0.00	1096.26	942.00	154.26	66.84
174		5.00	1095.94	922.00	173.94	75.38
175		0.00	1095.90	860.00	235.90	102.23
176		0.00	1096.59	933.00	163.59	70.89
177		2.00	1096.68	945.00	151.68	65.73
178		0.00	1096.84	920.00	176.84	76.63
179		0.00	1097.23	900.00	197.23	85.47
180		0.00	1097.25	905.00	192.25	83.31
181		5.00	1097.26	810.00	287.26	124.48
182		0.00	1097.32	860.00	237.32	102.84
183		0.00	1097.37	800.00	297.37	128.86
184		0.00	1097.56			
185		0.00	1097.77	700.00	397.77	172.37
186		0.00	1097.87	900.00	197.87	85.74
187		0.00	1097.72	710.00	387.72	168.01
188		5.00	1097.98	790.00	307.98	133.46
189		0.00	1098.35	930.00	168.35	72.95
190		0.00	1098.76	949.00	149.76	64.90
O-Pump-1	Minerva PS	0.00	1054.57	940.00	114.57	49.65
T-1	Berlin Tank	----	1100.00	980.00	120.00	52.00
T-2	Perina Tank	----	1100.00	960.00	140.00	60.67
T-3	Minerva Tank	----	1048.00	940.00	108.00	46.80
T-4	Highland Tan	----	1055.00	960.00	95.00	41.17
T-5	German Town	----	1100.00	980.00	120.00	52.00
I-Pump-1	Minerva PS	0.00	1048.00	940.00	108.00	46.80

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
143	240.18	49	40.11
13	198.34	55	41.15
167	197.55	56	41.15
158	192.48	T-4	41.17
22	173.23	51	42.47

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
49	2.52	58	0.00
207	2.50	97	0.01
63	1.67	105	0.01
75	1.59	121	0.01
81	1.59	132	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
49	4.57	58	0.00
207	4.49	105	0.00
63	1.53	121	0.00
75	1.39	132	0.00
81	1.39	133	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
49	4.57	58	0.00
207	4.49	105	0.00
63	1.53	121	0.00
75	1.39	132	0.00
81	1.39	133	0.00

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 SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
T-1	24.50	Berlin Tank
T-2	98.50	Perina Tank
T-3	0.00	Minerva Tank
T-4	38.00	Highland Tan
T-5	262.00	German Town

NET SYSTEM INFLOW = 423.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 423.00

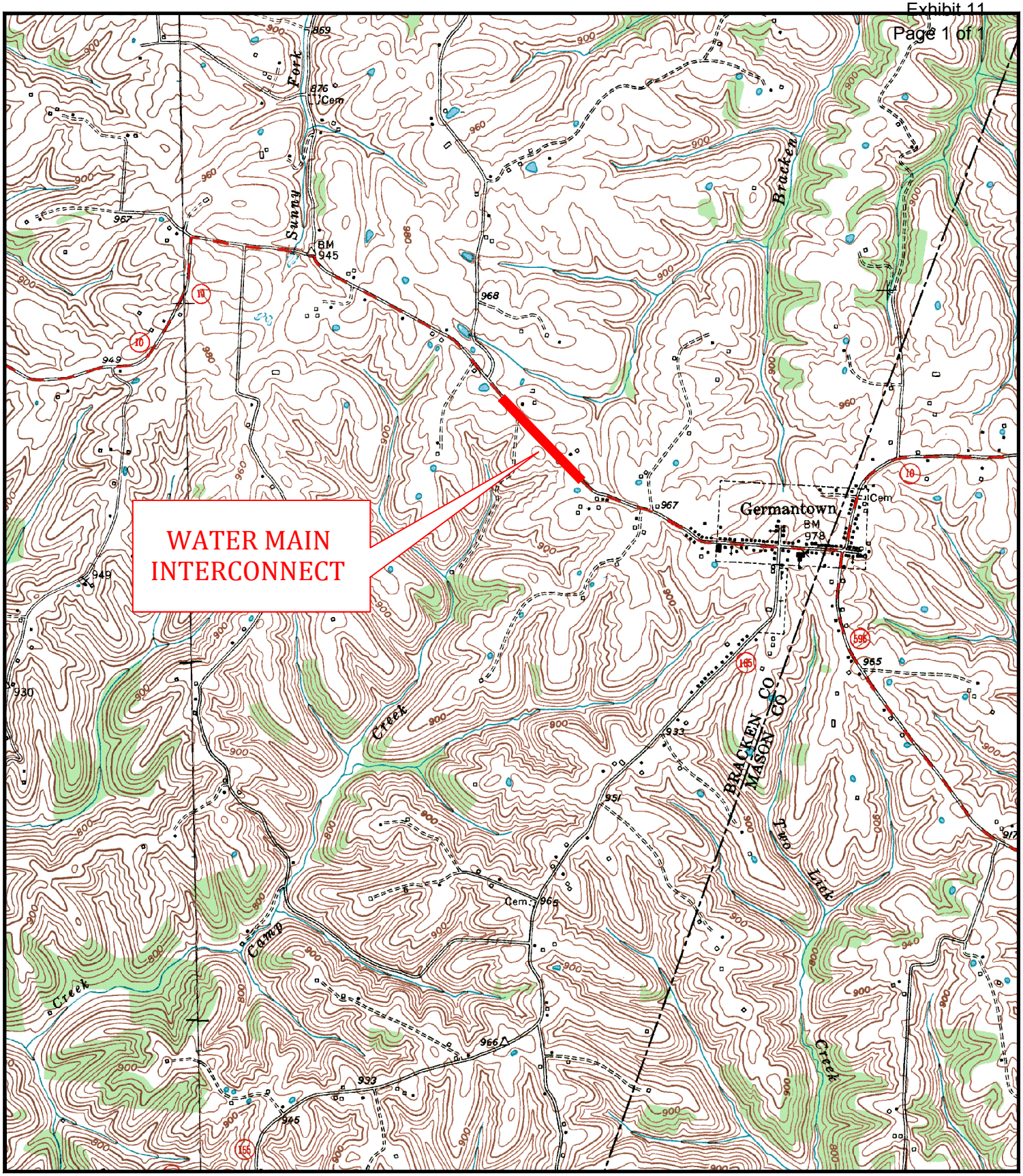
***** HYDRAULIC ANALYSIS COMPLETED *****

EXHIBIT 10

Bracken County Water District
Location of Proposed Interconnection

The proposed interconnection between Bracken County Water District and Western Mason County Water District will be located in eastern Bracken County along Kentucky Highway 10 near the western city limits of Germantown, Kentucky.

EXHIBIT 11



P:\PROJECTS\Bracken County Water District\14050 - Contract No. 2, KY 10 Interconnect to WMWD\DWG\Contract 2\14050 DOW Exhibit - KY 10 Interconnect.dwg KEG 11/02/15

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

Contract No.2

KY 10 INTERCONNECT to WESTERN MASON WATER DISTRICT

for the

BRACKEN COUNTY WATER DISTRICT
Brooksville, Kentucky

Project No.	14050
Date	SEPTEMBER 2015
Dwg. No.	1
Sheet	1

EXHIBIT 12

MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

December 23, 2015

Anthony Habermehl
Bracken Co Water District
1324 Brooksville Germantown Road
Brooksville, KY 41004

RE: Bracken Co Water District
AI # 33805, APE20150002
PWSID # 0120039-15-002
Contract 2 KY 10 Interconnect to Western Mason Water District
Bracken County, KY

Dear Mr. Habermehl:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 1,860 linear feet of 6 inch PVC water line. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit.

If you have any questions concerning this project, please contact Mr. William Wright at 502-564-3410 extension 4829.

Sincerely,

Terry Humphries, P.E.
Supervisor, Engineering Section
Water Infrastructure Branch
Division of Water

TH:WW

Enclosures
C: Kentucky Engineering Group, PLLC
Bracken County Health Department
Public Service Commission
Division of Plumbing

Distribution-Water Line Extension

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20150002

PORT0000000028 (Contract 2 KY 10 Interconnect to Western Mason) 1,860 linear feet of 6 inch PVC WLE:

Narrative Requirements:

Condition No.	Condition
T-1	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]
T-2	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-3	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-4	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-5	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-6	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-7	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-8	Water lines should be hydraulically capable of a flow velocity of 2.5 ft/s while maintaining a pressure of at least 20 psi. [Drinking Water General Design Criteria IV.1.b]
T-9	The normal working pressure in the distribution system at the service connection shall not be less than 30 psi under peak demand flow conditions. Peak demand is defined as the maximum customer water usage rate, expressed in gallons per minute (gpm), in the pressure zone of interest during a 24 hour (diurnal) time period. [Drinking Water General Design Criteria IV.1.d]
T-10	When static pressure exceeds 150 psi, pressure reducing devices shall be provided on mains or as part of the meter setting on individual service lines in the distribution system. [Drinking Water General Design Criteria IV.1.c]

Distribution-Water Line Extension
Bracken Co Water District
Facility Requirements

Activity ID No.: APE20150002

PORT0000000028 (continued):

Narrative Requirements:

Condition No.	Condition
T-11	The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three (3) inch diameter. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use, and can be considered only in special circumstances. [Recommended Standards for Water Works 8.2.2, Drinking Water General Design Criteria IV.2.b]
T-12	Water mains not designed to carry fire-flows shall not have fire hydrants connected to them. [Recommended Standards for Water Works 8.4.1.b]
T-13	Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]
T-14	No flushing device shall be directly connected to any sewer. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]
T-15	Pipe shall be constructed to a depth providing a minimum cover of 30 inches to top of pipe. [Drinking Water General Design Criteria IV.3.a]
T-16	Water mains shall be covered with sufficient earth or other insulation to prevent freezing. [Recommended Standards for Water Works 8.7]
T-17	A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth of at least six inches below the bottom of the pipe. [Recommended Standards for Water Works 8.7]
T-18	Water line installation shall incorporate the provisions of the AWWA standards and/or manufacturer's recommended installation procedures. [Recommended Standards for Water Works 8.7]
T-19	All materials used for the rehabilitation of water mains shall meet ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-20	Packing and jointing materials used in the joints of pipe shall meet the standards of AWWA and the reviewing authority. [Recommended Standards for Water Works 8.1]
T-21	All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.7]

Distribution-Water Line Extension
Bracken Co Water District
Facility Requirements

Activity ID No.: APE20150002

PORT0000000028 (continued):

Narrative Requirements:

Condition No.	Condition
T-22	All materials including pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the ASTM, AWWA and ANSI/NSF, where such standards exist, and be acceptable to the Division of Water. [Recommended Standards for Water Works 8.1]
T-23	Water mains which have been used previously for conveying potable water may be reused provided they meet the above standards and have been restored practically to their original condition. [Recommended Standards for Water Works 8.1]
T-24	Manufacturer approved transition joints shall be used between dissimilar piping materials. [Recommended Standards for Water Works 8.1]
T-25	Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-26	The minimum size of water main which provides for fire protection and serving fire hydrants shall be six?inch diameter. [Recommended Standards for Water Works 8.2, Drinking Water General Design Criteria IV.2.a]
T-27	Gaskets containing lead shall not be used. Repairs to lead?joint pipe shall be made using alternative methods. [Recommended Standards for Water Works 8.1]
T-28	Pipe materials shall be selected to protect against both internal and external pipe corrosion. [Recommended Standards for Water Works 8.1]
T-29	Dead end mains shall be equipped with a means to provide adequate flushing. [Recommended Standards for Water Works 8.2]
T-30	The hydrant lead shall be a minimum of six inches in diameter. Auxiliary valves shall be installed on all hydrant leads. [Recommended Standards for Water Works 8.4.3]
T-31	A sufficient number of valves shall be provided on water mains to minimize inconvenience and sanitary hazards during repairs. [Recommended Standards for Water Works 8.3]
T-32	Wherever possible, chambers, pits or manholes containing valves, blow?offs, meters, or other such appurtenances to a distribution system, shall not be located in areas subject to flooding or in areas of high groundwater. Such chambers or pits should drain to the ground surface, or to absorption pits underground. The chambers, pits and manholes shall not connect directly to any storm drain or sanitary sewer. Blow?offs shall not connect directly to any storm drain or sanitary sewer. [Recommended Standards for Water Works 8.6]

Distribution-Water Line Extension
Bracken Co Water District
Facility Requirements

Activity ID No.: APE20150002

PORT0000000028 (continued):

Narrative Requirements:

Condition No.	Condition
T-33	At high points in water mains where air can accumulate provisions shall be made to remove the air by means of air relief valves. [Recommended Standards for Water Works 8.5.1]
T-34	Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. [Recommended Standards for Water Works 8.5.1]
T-35	The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward?facing elbow. [Recommended Standards for Water Works 8.5.2.c]
T-36	Discharge piping from air relief valves shall not connect directly to any storm drain, storm sewer, or sanitary sewer. [Recommended Standards for Water Works 8.5.2.d]
T-37	Water pipe shall be constructed with a lateral separation of 10 feet or more from any gravity sanitary or combined sewer measured edge to edge where practical. If not practical a variance may be requested to allow the water pipe to be installed closer to the gravity sanitary or combined sewer provided the water pipe is laid in a separate trench or undisturbed shelf located on one side of the sewer with the bottom of the pipe at least 18 inches above the top of the gravity sanitary or combined sewer pipe. [Drinking Water General Design Criteria IV.3.b]
T-38	Water lines crossing sanitary, combined or storm sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sanitary, combined or storm sewer with preference to the water main located above the sanitary, combined or storm sewer. [Drinking Water General Design Criteria IV.3.c]
T-39	At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. [Recommended Standards for Water Works 8.8.3.b]
T-40	There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminating materials may be discharged or drawn into the system. [Recommended Standards for Water Works 8.10.1]
T-41	Water utilities shall have a cross connection program conforming to 401 KAR 8. [Recommended Standards for Water Works 8.10.1]
T-42	Installed pipe shall be pressure tested and leakage tested in accordance with the appropriate AWWA Standards. [Recommended Standards for Water Works 8.7.6]

Distribution-Water Line Extension

Bracken Co Water District

Facility Requirements

Activity ID No.: APE20150002

PORT0000000028 (continued):

Narrative Requirements:

Condition No.	Condition
T-43	New, cleaned and repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. In an emergency or unusual situation, the disinfection procedure shall be discussed with the Division of Water. [Recommended Standards for Water Works 8.7.7]
T-44	A minimum cover of five feet shall be provided over pipe crossing underwater. [Recommended Standards for Water Works 8.9.2]
T-45	Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding for pipes crossing underwater. [Recommended Standards for Water Works 8.9.2.b]
T-46	Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples on each side of the valve closest to the supply source for pipes crossing. [Recommended Standards for Water Works 8.9.2.c]

EXHIBIT 13

KENTUCKY INFRASTRUCTURE AUTHORITY
Minutes of the Full Board

Meeting Date/Location: February 4, 2016 – 1:00 p.m.
Kentucky Infrastructure Authority
1024 Capital Center Drive, Suite 340, Frankfort

Members present:

Ms. Sandra K. Dunahoo, Commissioner, Department for Local Government
Mr. Mark Bunning, Finance and Administration Cabinet
(Proxy for Secretary William Landrum, FAC)
Ms. Lona Brewer, Energy and Environment Cabinet
(Proxy for Secretary Charles Snavely, EEC)
Mr. Erik Dunnigan, Acting Secretary, Economic Development Cabinet
Mr. Jeff DeRouen, Executive Director, Public Service Commission
Mr. C. Ronald Lovan, representing the American Water Works Association
Ms. Linda C. Bridwell, representing for-profit private water companies
Mr. Paul Lashbrooke, representing the Kentucky Rural Water Association
Mr. David W. Cartmell, Mayor, City of Maysville, representing the Kentucky League of Cities
Mr. Jody Jenkins, Union County Judge Executive, representing the Kentucky Association of Counties
Mr. Martin T. Ivy, representing the Kentucky Municipal Utilities Association

Guests:

Mr. Jim Askins, Deputy Commissioner, Department for Local Government
Mr. Jory Becker, Division of Water
Ms. Bethany Couch, Office of Financial Management
Ms. Denise Pitts, Office of Financial Management
Ms. Sandy Williams, Office of Financial Management
Mr. Ryan Barrow, Office of Financial Management
Ms. Jennifer Peters, Department for Local Government
Mr. Roger Recktenwald, Kentucky Association of Counties
Mr. Gary Larimore, Kentucky Rural Water Association
Ms. Cindy McDonald, Division of Water
Mr. John Fischer, Economic Development Cabinet
Ms. Lisa Wilson, Kenvirons
Mr. Joe Schepers, Regional Water Resource Agency
Mr. Sean O'Bryan, Regional Water Resource Agency
Mr. Jeff Schuchter, Northern Kentucky Water District
Mr. Bob Sturdivant, HDR
Mr. John Hodges, Paducah McCracken Joint Sewer Agency
Mr. Josh Web, Paducah McCracken Joint Sewer Agency
Mr. Allen Norvell, Blue & Company
Mr. Bob Pickerill, Bell Engineering
Ms. Annette DuPont-Ewing, Kentucky Municipal Utilities Association
Ms. Ruth Webb, First Kentucky Securities Corporation

PROCEEDINGS

Vice Chairman Linda Bridwell called the meeting of the Kentucky Infrastructure Authority (KIA) Board to order. Vice Chair Bridwell confirmed that a quorum was present and that the press had been notified regarding the meeting. Ms. Bridwell asked board members and guests to introduce themselves.

I. BUSINESS (Board Action Required)

APPROVAL OF MINUTES
For: KIA Regular Board Meeting of December 3, 2015

***Mr. Ron Lovan moved to approve the Minutes of the December 3, 2015, regular board meeting. Mr. David Cartmell seconded, and the motion carried unanimously*.**

B. NEW PROJECTS/ACTION ITEMS

1. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKYINFRASTRUCTURE AUTHORITY AUTHORIZING THE ELECTION OF CHAIR OF THE KENTUCKY INFRASTRUCTURE AUTHORITY

Ms. Linda Bridwell discussed the By-Laws of KIA, which state there will be a Chair, Vice Chair and First Vice Chair, that all serve on the Executive Committee.

Ms. Bridwell opened the floor for nominations.

Mr. Ron Lovan moved to nominate Ms. Sandra K. Dunahoo, Commissioner for the Department for Local Government. Mr. David Cartmell seconded the nomination. There being no further nominations, the motion carried unanimously.

Mr. Ron Lovan moved to approve Ms. Dunahoo, the motion was seconded by Mr. Marty Ivy and the motion carried unanimously.

2. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING THE ELECTION OF 1ST VICE CHAIR OF THE KENTUCKY INFRASTRUCTURE AUTHORITY

Mr. Erik Dunnigan moved to nominate Mr. Charles G. Snavely, Secretary of the Energy and Environment or the appointed proxy as the KIA First Vice Chair. Mr. Ron Lovan seconded the nomination. There being no further nominations, the motion carried.

Mr. Paul Lashbrooke moved to approve Mr. Snavely or the appointed proxy, the motion was seconded by Mr. David Cartmell and the motion carried unanimously.

3. CONSIDERATION OF THE FISCAL YEAR END JUNE 30, 2015 KENTUCKY INFRASTRUCTURE AUTHORITY AUDIT REPORT

Mr. Jeff Abshire, KIA, and Mr. Allen Norvell, Blue and Company, LLC, presented a review of the Kentucky Infrastructure Authority Audit for fiscal year ending June 30, 2016. Mr. Norvell highlighted some of the significant points in the financial statement report.

Ms. Linda Bridwell asked if the audit discussion could be tabled until the March meeting. Some Board members had concerns about limited time to review the information. Jeff DeRouen made the motion to table further discussion until the March KIA Board meeting. Mr. Cartmell seconded and the motion was unanimously approved.

Chair Dunahoo advised that the board would take three projects under consideration for the Regional Water Resource Agency, (RWRA) listed in the agenda as Action Item 4, Fund A Loan (A16-026) in the amount of $3,465,000, Fund A loan (A16-042) in the amount of $500,000 and Fund A Loan (A16-43) in the amount of $485,000.

4. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A FEDERALLY ASSISTED CLEAN WATER REVOLVING FUND A LOAN (A16-026) IN THE AMOUNT OF $3,465,000 TO THE REGIONAL WATER RESOURCE AGENCY GOVERNMENT, DAVIESS COUNTY, KENTUCKY

Mr. Jory Becker, DOW, and Ms. Brandi Norton, KIA, discussed The Regional Water Resource Agency's (RWRA) request a Fund "A" loan in the amount of $3,465,000 for the Ravine Sewer Upgrade project. The project will reconstruct and upgrade the Ravine Interceptor Sewer that conveys combined sewage to the north portion of the Owensboro sewer system. The condition of the current line is unstable and has various structural issues due to improper pipe sizing during instillation. The existing line crosses several City blocks that do not have dedicated easements, which is problematic during repair efforts. The project will ultimately separate storm water and waste water into separate pipes conveying the storm water out of the combined sewer system.

RWRA was created by the enactment of identical ordinances by the City of Owensboro and Daviess County Fiscal Court on October 18, 1994 and October 5, 1994, respectively, for the purpose of managing, controlling and operating regional comprehensive wastewater facilities within Daviess County. RWRA is considered a related organization of the City of Owensboro and Daviess County. All operations of the RWRA are managed by its own professional staff and governed by a board of

directors, which consists of four city board appointments and three county board appointments.

RWRA revenue is derived 100% from its ratepayers who reside in areas of Daviess County inside and outside of the city limits.

RWRA is a regionalization model for other counties in Kentucky and nationally. The Wastewater Treatment Plant was highlighted in EPA's 2004 Annual Report on the Clean Water State Revolving Fund Programs.

A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A FEDERALLY ASSISTED CLEAN WATER REVOLVING FUND A LOAN (A16-042) IN THE AMOUNT OF $500,000 TO THE REGIONAL WATER RESOURCE AGENCY GOVERNMENT, DAVIESS COUNTY, KENTUCKY

Mr. Jory Becker, DOW, and Ms. Brandi Norton, KIA, discussed The Regional Water Resource Agency's (RWRA) request a Fund "A" loan in the amount of $500,000 for the Pleasant View Estates Sewer Extension project. The project will provide sanitary sewer service to 48 households within the Pleasant View subdivision. The project will include the extension of sewer lines to unserved homes and the elimination of septic systems. The project will aid in clearing up water quality in the area and eliminating further environmental concerns.

RWRA was created by the enactment of identical ordinances by the City of Owensboro and Daviess County Fiscal Court on October 18, 1994 and October 5, 1994, respectively, for the purpose of managing, controlling and operating regional comprehensive wastewater facilities within Daviess County. RWRA is considered a related organization of the City of Owensboro and Daviess County. All operations of the RWRA are managed by its own professional staff and governed by a board of directors, which consists of four city board appointments and three county board appointments.

RWRA revenue is derived 100% from its ratepayers who reside in areas of Daviess County inside and outside of the city limits.

RWRA is a regionalization model for other counties in Kentucky and nationally. The Wastewater Treatment Plant was highlighted in EPA's 2004 Annual Report on the Clean Water State Revolving Fund Programs.

A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A FEDERALLY ASSISTED CLEAN WATER REVOLVING FUND A LOAN (A16-043) IN THE AMOUNT OF $485,000 TO THE REGIONAL WATER RESOURCE AGENCY GOVERNMENT, DAVIESS COUNTY, KENTUCKY

Mr. Jory Becker, DOW, and Ms. Brandi Norton, KIA, discussed The Regional Water Resource Agency's (RWRA) request for a Fund "A" loan in the amount of $485,000

for the Woodlands South Sewer Extension project. The project will provide sanitary sewer service to 70 households within the Woodland's subdivision.

The project will include the extension of sewer lines to unserved homes and the elimination of septic systems. The project will aid in clearing up water quality in the area and eliminating further environmental concerns.

RWRA was created by the enactment of identical ordinances by the City of Owensboro and Daviess County Fiscal Court on October 18, 1994 and October 5, 1994, respectively, for the purpose of managing, controlling and operating regional comprehensive wastewater facilities within Daviess County. RWRA is considered a related organization of the City of Owensboro and Daviess County. All operations of the RWRA are managed by its own professional staff and governed by a board of directors, which consists of four city board appointments and three county board appointments.

RWRA revenue is derived 100% from its ratepayers who reside in areas of Daviess County inside and outside of the city limits.

RWRA is a regionalization model for other counties in Kentucky and nationally. The Wastewater Treatment Plant was highlighted in EPA's 2004 Annual Report on the Clean Water State Revolving Fund Programs.

Ms. Linda Bridwell made the motion to approve the three loans, Fund A loan (A16-26) in the amount of $3,465,000, Fund A loan (A16-042) in the amount of $500,000 and Fund A loan (A16-43) in the amount of $485,000 the Fund A loan (A16-026) in the amount of $3,465,000 to the Regional Water Resource Agency with the standard conditions. Ms. Lona Brewer seconded and the motion was unanimously approved.

5. **A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A FEDERALLY ASSISTED CLEAN WATER REVOLVING FUND A LOAN (A16-072) IN THE AMOUNT OF $2,385,000 TO THE PADUCAH MCCRACKEN COUNTY JOINT SEWER AGENCY GOVERNMENT, MCCRACKEN COUNTY, KENTUCKY**

Mr. Jory Becker, DOW, and Ms. Sarah Aitken, KIA, discussed The Paducah McCracken County Joint Sewer Agency's request for a Fund "A" loan in the amount of $2,385,000 for the Reidland Collection System Above Ground Storage Tank project. The project will entail construction of a 1.5 MGD wet weather storage tank, along with associated influent pumping station and collection line size improvements. The purpose of this tank is to store excess wet weather flows in the Reidland System, preventing sanitary sewer overflows. The modifications to the gravity piping are necessary to ensure the flow can get to the influent pumping station, which will be modified to allow for pumping to the tank simultaneously while feeding the treatment plant without surcharging.

The Utility provides sewer services for approximately 18,308 households within McCracken County.

Mr. Marty Ivy made the motion to approve Fund A loan (A16-072) in the amount of $2,385,000 to the Paducah McCracken County Joint Sewer Agency with the standard conditions. Mr. Ron Lovan seconded and the motion was unanimously approved.

6. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR AN INFRASTRUCTURE REVOLVING FUND LOAN (B16-008) OF $401,625 TO THE REID VILLAGE WATER DISTRICT, MONTGOMERY COUNTY, KENTUCKY

Ms. Brandi Norton, KIA, discussed The Reid Village Water District's request for a $401,625 fund "B" loan for the Office and Maintenance Building Purchase project. This project includes the purchase of commercial property to serve as the District's headquarters for office and field personnel. The property includes two existing structures, an office building and a maintenance building. Both structures are located on the same parcel of land with a large paved area to accommodate high volumes of traffic and parking for District staff and equipment. The maintenance building will allow the District to securely store equipment, tools, materials, and vehicles out of the weather. The structure also includes the hydraulic lift which will enable the utility to perform routine maintenance on vehicles and equipment, thus allowing for cost savings to the District.

The District serves approximately 1,038 households and annually purchases 66 Million Gallons from Mount Sterling Water and Sewer.

Mr. Jeff DeRouen recused himself from the vote. Ms. Linda Bridwell made the motion to approve Fund B loan (B16-008) in the amount of $401,625 to the Reid Village Water District with the standard conditions. Mr. Mark Bunning seconded and the motion was unanimously approved.

7. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A GOVERNMENTAL AGENCIES PROGRAM FUND C LOAN (C95-04) IN THE AMOUNT OF $47,500 TO THE MCLEAN COUNTY REGIONAL WATER COMMISSION, MCLEAN COUNTY, KENTUCKY

Ms. Debbie Landrum, KIA, discussed the McLean County Regional Water Commission's request for a Fund "C" loan to assume the City of Calhoun's remaining balance of debt from KIA loan C95-04 in the amount of $47,500.

The City of Calhoun conveyed various properties, which included their water plant to the McLean County Regional Water Commission. The Commission has currently begun construction on a new water treatment plant located near the existing Calhoun treatment plant. This new plant will service much of McLean County. In the interim, the Commission is servicing the existing Calhoun customers including Rumsey, Island and the North McLean Water District by operating the old plant. The Commission has contracted with the City for the operation of the plant. The closing

of this transaction occurred October, 2015 with the agreement by the Commission to assume the existing KIA debt.

The McLean County Regional Water Commission will be permitted as a Regional Water Commission. The Utility will provide service to 5 wholesale customers across the County (Livermore, Island, Sacramento, Calhoun and North McLean Counties) which service 3,851customers.

Ms. Linda Bridwell made the motion to approve Fund C loan (C95-04) in the amount of $47,500 to the McLean County Regional Water Commission with the standard conditions. Mr. Paul Lashbrooke seconded and the motion was unanimously approved.

8. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING ISSUANCE OF A CONDITIONAL COMMITMENT FOR A FEDERALLY ASSISTED DRINKING WATER REVOLVING FUND LOAN (F16-027) OF $4,000,000 TO THE NORTHERN KENTUCKY WATER DISTRICT GOVERNMENT, KENTON COUNTY, KENTUCKY

Mr. Ron Lovan excused himself and left the room.

Mr. Jory Becker, DOW, and Ms. Jami Johnson, KIA, discussed The Northern Kentucky Water District's request a Fund "F" loan in the amount of $4,000,000 for the Campbell and Kenton County Water Main Replacement and SCADA Improvements project. The project will replace three water mains on four streets, replace a 36 inch cross country transmission main with a 24 inch main, and include SCADA improvements on approximately 40 sites. The water main replacements were broken down into multiple phases and contracts to mitigate the risk of delays in project completion. The project phases are listed below.

Project Summaries
Phase 1- Buttermilk Pike water main replacement includes replacement of approximately 2,775 linear feet (LF) of 6 inch main with 8 inch main on 2 streets in Kenton County.

Phase 2- 36 inch Concrete Water Main Replacement for 2,250 LF of 36 inch transmission main with new 24 inch cross- county main in Kenton County.

Phase 3- Ann Street and Putnam Street Water Main Replacement will replace 2,160 LF of 4 inch main with 8 inch main on Ann Street and 1,090 LF on Putnam Street in Campbell County.

Phase 4- SCADA Improvements in Campbell and Kenton Counties which will replace equipment for security and remote operation of the distribution system including programmable logic controllers, radio equipment and sensors, and water quality analyzers for approximately 40 sites with tanks, pump stations or meter and regulator valves.

The District provides service to Campbell and Kenton counties and portions of Boone, Grant and Pendleton counties and is regulated by the Public Service

Commission. Wholesale service is provided to the City of Walton and the Bullock Pen and Pendleton County Water Districts.

Ms. Johnson noted prior to today's meeting, The Northern Kentucky Water District had some changes to their original timeline, which would affect her analysis slightly; it does not impact their financial information.

Mr. Jeff DeRouen recused himself from voting. Ms. Linda Bridwell asked if the project could be tabled until the March meeting. She expressed concerns with so many new Board members and changes to the project timeline, if it would be best to allow staff to update the project profile for the March KIA meeting. Ms. Lona Brewer seconded and the motion was tabled.

Mr. Ron Lovan reentered the room.

Mr. Adam Scott discussed residual funds. Often times, projects come in under budget. Communities have asked to use the remaining funds for another project similar to their original. In the past KIA, staff has used their discretion to determine if the project is viable for the remaining funds. For future use of residual funds, KIA staff thinks Board approval on the use of residual funds is the appropriate manner in which to handle these monies. This is not an open line of credit for the entity. The Division of Water reviews the projects initially and gives their approval. On the Agenda for consideration are two projects asking to use residual funds.

9. A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS FOR APPROVAL TO USE RESIDUAL FUNDS OF A FUND F LOAN (F13-004) IN THE AMOUNT OF $100,732 FOR THE CITY OF SEBREE, WEBSTER COUNTY, KENTUCKY

Ms. Brandi Norton, KIA, discussed the City of Sebree's request to use $100,732, in residual funds for the proposed Sebree water line extension consists of approximately 1,700 linear feet of 6-inch PVC water line along Highway 370 beginning at Old Steamport Road and extending to the west. The purpose of the extension is to connect a 4-inch dead line on Old Steamport Road and a 6-inch dead end line on Highway 370. This connection will provide a needed loop in the system to prevent two dead end lines and to reduce the possibility of stale water and interruption of service should a line need to be closed. The extension will provide water to one potential customer.

The City would like to Change Order in the additional work. If approved, The City has been given a timeline in which the project will be completed and repayment will begin.

Mr. Ron Lovan expressed concerns as to what the urgency was to approve the project. KIA staff noted that contractors were on-site to complete the work and if approval was delayed, The City of Sebree could be negatively affected with additional costs.

Mr. Lovan would like KIA staff to prepare a process to bring back to the Board at the March meeting for the distribution of residual funds.

Mr. Lovan made a motion to table the two entities, City of Sebree and Bracken County, requesting use of residual funds on the Agenda.

A new motion by Commissioner Dunahoo, staff will present a revised plan(s) at the March KIA meeting, motion carried. Jeff DeRouen suggested new language be put in the contract for residual funds.

Mr. Dunnigan made the motion to approve the City of Sebree to use the residual funds. Mr. Mark Bunning seconded and the motion carried. Mr. Lovan opposed the motion.

10. **A RESOLUTION AND ORDER OF THE BOARD OF DIRECTORS FOR APPROVAL TO USE RESIDUAL FUNDS OF A FUND B LOAN (B15-002) IN THE AMOUNT OF $91,600 FOR THE BRACKEN COUNTY WATER DISTRICT, BRACKEN COUNTY KENTUCKY**

Ms. Brandi Norton, KIA, discussed the Bracken County Water District's request to use residual funds. The Bracken County Water District would like to perform additional work that would include the installation of approximately 1,800 LF of 6" PVC water main and related appurtenances and installation of new master meter fault. This work would provide an emergency interconnection with Western Mason Water District and provide improved service to Bracken County Water District customers along and off Highway 10 in eastern Bracken County. The Bracken County Water District would like to Change Order in the additional work.

Bracken County would negatively be affected if this is delayed. They have equipment onsite to do the work; delays could result in the need for additional funding.

Mr. DeRouen recused himself. Mayor Cartmell made the motion to approve Bracken County's use of $91,600. Mr. Lashbrooke seconded the motion, which carried. Mr. Lovan opposed, noting the urgency of the matter.

11. **A RESOLUTION OF THE KENTUCKY INFRASTRUCTURE AUTHORITY AUTHORIZING AND APPROVING THE ISSUANCE OF OBLIGATIONS OF THE KENTUCKY INFRASTRUCTURE AUTHORITY TO REIMBURSE CAPITAL EXPENDITURES MADE BY GOVERNMENTAL AGENCIES PURSUANT TO LOANS MADE BY THE KENTUCKY INFRASTRUCTURE AUTHORITY TO SUCH GOVERNMENTAL AGENCIES**

This is a routine resolution allowing KIA to reimburse expenses that are paid out of the Authority's funds with bond proceeds. The projects listed below are covered under this resolution:

APPLICANT	FUND	AMOUNT
Regional Water Resource Agency	A16-026	$ 3,465,000
Regional Water Resource Agency	A16-042	$ 500,000
Regional Water Resource Agency	A16-043	$ 485,000
Paducah McCracken County Joint Sewer Agency	A16-072	$ 2,385,000
Reid Village Water District	B16-008	$ 401,625
Northern Kentucky Water District	F16-027	$ 4,000,000

Ms. Linda Bridwell moved to approve the resolution. Mr. Cartmell seconded and the motion carried unanimously.

12. A RESOLUTION (THE PRELIMINARY BOND RESOLUTION) OF THE BOARD OF THE KENTUCKY INFRASTRUCTURE AUTHORITY (AUTHORITY) AUTHORIZING THE EXECUTION OF A SERIES TRUST INDENTURE BY AND BETWEEN THE KENTUCKY INFRASTRUCTURE AUTHORITY AND U.S. BANK NATIONAL ASSOCIATION, LOUISVILLE, KENTUCKY; PROVIDING FOR THE ISSUANCE OF KENTUCKY INFRASTRUCTURE AUTHORITY WASTEWATER AND DRINKING WATER REVOLVING FUND PROGRAM REVENUE REFUNDING BONDS, SERIES 2016A IN AN AGGREGATE PRINCIPAL AMOUNT NOT TO EXCEED $110,000,000 UNDER THE TERMS OF A SERIES TRUST INDENTURE AND THE GENERAL TRUST INDENTURE DATED AS OF MARCH 1, 2010 BETWEEN THE AUTHORITY AND U.S. BANK NATIONAL ASSOCIATION; AUTHORIZING THE EXECUTION AND DELIVERY OF AN ESCROW TRUST AGREEMENT BETWEEN THE AUTHORITY AND U.S. BANK NATIONAL ASSOCIATION; PROVIDING FOR THE PAYMENT OF THE PRINCIPAL OF AND INTEREST ON SAID BONDS; AUTHORIZING THE SALE OF SAID BONDS; AND REPEALING ALL RESOLUTIONS OR PARTS THEREOF IN CONFLICT WITH THE PROVISIONS HEREOF.

Ms. Bridwell moved to approve the preliminary bond resolution authorizing the sale of the bonds. Mr. Dunnigan seconded and the motion carried unanimously.

II. EXECUTIVE DIRECTOR'S REPORT

Kentucky Infrastructure Authority Secretary Adam Scott addressed the group. He noted that KIA staff has been working with the Division of Water on procedures dealing with Change Orders. He noted that staff will bring recommendations back to the Board.

Mr. Scott also discussed the Kentucky Sewer and Water Interagency Group (KSWIG) meetings regarding the abandonment of Package Treatment Plants throughout the Commonwealth. He reiterated that the KIA Board has set aside $500,000 to assist in the abandonment process and find receivers. Mr. Scott informed the board that the money for these projects needs to be allocated by the end of the fiscal year. This is

principal forgiveness money and it must be used for construction projects. Initially, five Package Treatment Plants have been identified for assistance. Mr. Scott asked the board for approval to begin discussions with the entities in Franklin and Daviess County.

Mr. Scott also informed the board that the amended 2016 Intended Use Plan (IUP) is on the KIA website. The IUP was amended due to the addition of projects and moving remaining funds from the Clean Water program to the Drinking Water program.

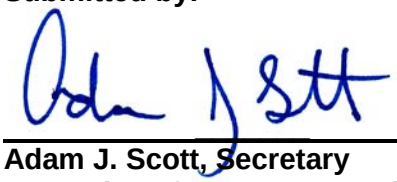
III. STATUS REPORT FOR FUNDS A, A2, B, B1, C, F, F2

ANNOUNCEMENTS/NOTIFICATIONS

Next scheduled KIA board meeting:
Tentatively set for Thursday, March 3, 2016
1024 Capital Center Drive, Suite 340
Frankfort, Kentucky

There being no further business Commissioner Dunahoo moved to adjourn. Ms. Bridwell made the motion to adjourn the February KIA Board meeting. Mr. Dunnigan seconded and the motion carried unanimously. The February 4, 2015, regular meeting of the Board of the Kentucky Infrastructure Authority was adjourned.

Submitted by:



02/24/2016

Adam J. Scott, Secretary **Date**
Kentucky Infrastructure Authority

AGENDA

KENTUCKY INFRASTRUCTURE AUTHORITY
FULL BOARD MEETING
1024 CAPITAL CENTER DRIVE, SUITE 340
February 4, 2016 – 1:00 p.m.

Call to Order: • Confirmation of Press Notice • Confirmation of Quorum • Recognition of Members/Guests	Vice Chair Linda Bridwell	
I. BUSINESS (Board Action Required)		
A. Minutes		
1. Consideration of Approval of the **Minutes** of the **Kentucky Infrastructure Authority Regular Board Meeting** of **December 3, 2015** ***(Attachment I.A.1.)***	Vice Chair Linda Bridwell	9
B. New Projects / Action Items		
1. Resolution and Order of the Board of Directors Authorizing the **Election of the Chair** of the Kentucky Infrastructure Authority		
2. Resolution and Order of the Board of Directors Authorizing the **Election of the 1st Vice Chair** of the Kentucky Infrastructure Authority		
3. Consideration of the Fiscal Year End June 30, 2015 Kentucky Infrastructure Authority Audit Report ***(Handout)***	Mr. Jeff Abshire, KIA Mr. Allen Norvell, CPA, Director, Blue & Co., LLC	
4. Resolution and Order of the Board of Directors for Approval of **Fund A loan (A16-026)** in the amount of **$3,465,000, Fund A loan (A16-042)** in the amount of **$500,000** and **Fund A loan (A16-043)** in the amount of **$485,000** to the **Regional Water Resource Agency, Daviess County, Kentucky** (SX21059027, SX21059039, SX21059026) ***(Attachment I.B.1.)***	Mr. Jory Becker, DOW Ms. Brandi Norton, KIA	19
5. Resolution and Order of the Board of Directors Authorizing of **Fund A loan (A16-072)** in the amount of **$2,385,000** to the **Paducah McCracken County Joint Sewer Agency, McCracken County, Kentucky** (SX21145015) ***(Attachment I.B.2.)***	Mr. Jory Becker, DOW Ms. Sarah Aitken, KIA	59
6. Resolution and Order of the Board of Directors for Approval of a **Fund B loan (B16-008)** in the amount of **$401,625** to the **Reid Village Water District, Montgomery County, Kentucky** (WX21173139) ***(Attachment I.B.3.)***	Ms. Brandi Norton, KIA	73

III. ANNOUNCEMENTS/NOTIFICATIONS — Mr. Adam Scott, KIA

1. *Next KIA Board Meeting:*
   Tentatively** set for **Thursday, March 3, 2016
   Kentucky Infrastructure Authority
   1024 Capital Center Drive, Suite 340, Frankfort

V. ADJOURN — Chair

ATTACHMENT

I.B.7.

REQUEST TO USE RESIDUAL LOAN FUNDS

Please complete this form and submit to the attention of Jami Johnson (jami.johnson@ky.gov) at the Kentucky Infrastructure Authority. Requests are reviewed and approved case-by-case, based on project scope and funding availability. KIA will notify borrowers within 30 days of receipt of this request. Upon approval, the WRIS, Project Profile must be updated to include the additional scope of work and budget information.

1. **Legal Applicant:** Bracken County Water District
2. **Contact:** Diana Moran **Phone:** (606) 735-3513 **Email:** d.moran@brackencountywate
3. **Project Title:** Bracken County Water District - KY 19 Master Meter to Kelly Ridge
4. **Existing Loan Number:** B15-002 **WRIS Number:** SX/WX 21023045

5. **Description of work to be performed with residual funds:**

Additional work to be performed will include installation of approximately 1,800 LF of 6" PVC water main and related appurtenances and installation of a new master meter vault. This work will provide an emergency interconnection with Western Mason Water District and provide improved service to Bracken County Water District customers along and off of Highway 10 in eastern Bracken County.

6. **How is the proposed work related to the original scope of the project that was approved by the KIA board?**

The original scope of the project included replacement of deteriorating AC waterline that was prone to leaks and reduced customer service to customers in this area. The proposed work to utilize the residual funds does not replace any deteriorating AC waterline, but it does provide improved service to customers along Highway 10 and offer those customers an additional source of potable water in the event of an emergency situation.

7. **Total cost of work to be performed with residual funds:** $91,600
8. **Will the additional work be advertised for bids or executed via change order?** Change order

Please complete the schedule for the proposed work:

Bid Advertisement	
Bid Opening	
Contract Award	
Construction Start	03/01/16
Construction End	04/01/16

9. **Is the original project complete?** Yes **If not, what is the anticipated date for completion?** _____

10. **What is the anticipated date to administratively close the entire project? (Initiation of Operation, Closeout Cert., etc.)** 6/1/16

To the best of my knowledge and belief, data contained in this request are true and correct; the document has been duly authorized by the legal applicant.

ANTHONY HABERMEHL, CHAIRMAN
Typed Name and Title

Signature of Legal Applicant

1/20/16
Date

SRF Project Cost Summary

Project Title: Bracken County Water District - KY 19 Master Meter to Kelly Ridge **WRIS#:** WX21023045

Project Budget: Estimated (enter date) **As Bid** (enter date) **Revised** 1/12/16 (enter date)

	Cost Classification	SRF KIA Loan	Funding Source 1	Funding Source 2	Funding Source 3	Funding Source 4	Funding Source 5	Local Funds	Unfunded Costs	Total
1	Administrative Expenses	7000								
2	Legal Expenses	2500								
3	Land, Appraisals, Easements	0								
4	Relocation Expenses & Payments									
5	Planning									
6	Engineering Fees – Design	35310								
7	Engineering Fees – Construction									
8	Engineering Fees – Inspection	30180								
9	Engineering Fees – Other									
10	Construction	275910						38506		
11	Equipment									
12	Miscellaneous									
13	Contingencies	7100								
	Total	$358,000	$0	$0	$0	$0	$0	$38,506	$0	$396,506

	Funding Sources	Amount	Date Committed
1	KIA Fund B	358000	12/04/14
2			
3			
4			
5			
	Total	$358,000	

	Local Funding Sources	Amount	Date Committed
1	Bracken County Water District	38506	01/01/16
2			
3			
	Total	$38,506	

Total Funding $396,506

Cost Categories	Funding Source	Total Cost
Treatment (DW)		
Transmission and Distribution (DW)	KIA Fund B	358000
Source (DW)		
Storage (DW)		
WWTP Secondary Portion (CW)		
WWTP Advanced Portion (CW)		
Inflow and Infiltration Correction (CW)		
Major Sewer Rehabilitation (CW)		
Collector Sewers (CW)		
Combined Sewer Overflow Correction (CW)		
Interceptor Sewers Including Pump Station (CW)		
Purchase of Systems (DW and CW)		
Restructuring (DW and CW)		
Land Acquisition (DW and CW)		
Total Costs		$358,000

EXHIBIT 14

KENTUCKY ENGINEERING GROUP, PLLC

Preliminary Project Cost Estimate

Project : Bracken County WD - Western Mason Interconnect
Date : 01/19/16 **Job No. :** 14050
Revised : **Est. By:** PR

ITEM NO.	SUMMARY OF: Contract 2 - KY 10 Interconnect to Western Mason Water District	QUANTITY NO. OF UNITS	UNIT MEAS.	COST PER UNIT		TOTAL COST
1	6" PVC Cl. 200 Water Main	1,860	LF	$15.00		$27,900.00
2	Open Cut 14" PVC Casing Pipe (SDR 35)	40	LF	$120.00		$4,800.00
3	6" Gate Valve	2	EA	$1,000.00		$2,000.00
4	Flushing Hydrant	1	EA	$3,800.00		$3,800.00
5	Master Meter Vault and Appurtenances	1	LS	$31,450.00		$31,450.00
6	Reconnect Existing Meters to New Main	2	EA	$500.00		$1,000.00
	SUBTOTAL AMOUNT					$ 70,950.00
	10% CONST. CONTINGENCY					$ 7,100.00
	ENGINEERING DESIGN		9.93%			$ 7,050.00
	RESIDENT INSPECTION		9.22%			$ 6,500.00
	TOTAL ESTIMATED CONSTRUCTION COST					$ 91,600.00

EXHIBIT 15

A RESOLUTION OF THE BOARD OF COMMISSIONERS OF BRACKEN COUNTY WATER DISTRICT AUTHORIZING THE CONSTRUCTION OF AN INTERCONNECTION WITH WESTERN MASON COUNTY WATER DISTRICT AND APPLICATION OF THE REMAINING PROCEEDS FROM KENTUCKY INFRASTRUCTURE AUTHORITY ASSISTANCE AGREEMENT (B15-002) TOWARDS THE COST OF THAT CONSTRUCTION

WHEREAS, on December 4, 2014 Kentucky Infrastructure Authority ("KIA") approved a loan to Bracken County Water District from Infrastructure Revolving Loan Fund (Fund B) in an amount not to exceed $358;000 to perform the KY 19 Master Meter to Kelly Ridge Water Main Replacement Project;

WHEREAS, Bracken County Water District subsequently executed an Assistance Agreement (B15-002) with KIA to obtain this loan;

WHEREAS, Bracken County Water District completed construction of the KY 19 Master Meter to Kelly Ridge Water Main Replacement Project at a cost substantially less than the originally estimated;

WHEREAS, approximately $61,497.95 of the proceeds of the Assistance Agreement remain unspent and are available for use;

WHEREAS, Bracken County Water District has entered a water purchase agreement with Western Mason County Water District to provide an emergency supply of water, to diversify its sources of water, and to reduce its risk of water shortage or stoppage;

WHEREAS, no current interconnection exists between Bracken County Water District and Western Mason County Water District to implement this contract;

WHEREAS, the Kentucky Division of Water has approved plans and specifications for a proposed interconnection entitled "Contract 2 – KY 10 Interconnect with Western Mason Water District," which consists of the installation of 1,800 linear feet of six-inch polyvinyl chloride water main, a six-inch gate valve, a flushing hydrant, and a master meter vault;

WHEREAS, KIA has authorized Bracken County Water District to use the remaining proceeds of the Assistance Agreement (B15-002) for the costs of constructing an interconnection and to issue a change order to the original KY 19 Master Meter to Kelly Ridge Water Main Replacement Project to include the construction of the proposed interconnection; and,

WHEREAS, Bracken County Water District must obtain the authorization from the Kentucky Public Service Commission to use the remaining $61,497.95 of the Assistance Agreement proceeds to finance a portion of the cost of the proposed interconnection.

NOW, THEREFORE, IT IS HEREBY RESOLVED BY THE BOARD OF COMMISSIONERS OF BRACKEN COUNTY WATER DISTRICT AS FOLLOWS:

Section 1. The facts, recitals, and statements contained in the foregoing preamble of this Resolution are true and correct and are hereby affirmed and incorporated as a part of this Resolution.

Section 2. The Chairman is authorized and directed to take any and all actions reasonably necessary to undertake and complete the construction of the proposed interconnection with Western Mason County Water District, to include the issuance of a change order to the KY 19 Master Meter to Kelly Ridge Water Main Replacement Project to include Contract 2 – KY 10 Interconnect with Western Mason Water District, and to apply all remaining proceeds from KIA Assistance Agreement B15-002 to the cost of the proposed interconnection, provided, however, that no proceeds from KIA Assistance Agreement (B15-002) will be expended on the proposed interconnection until the Kentucky Public Service Commission has authorized Bracken County Water District's use of such funds for that purpose.

ADOPTED BY THE BOARD OF COMMISSIONERS OF BRACKEN COUNTY WATER DISTRICT at a meeting held on March 16, 2016, signed by the Chairman, and attested by the Secretary.

Chairman

ATTEST:

Secretary

EXHIBIT 16

Page 1

NOTIFICATION OF INTENT TO FINANCE AND APPLICATION FOR DEBT APPROVAL

Form # SLDO-1
Revised 1/1/2011

For DLG staff use only:
File #
Received

Completion and delivery of this form to the address below shall satisfy the requirements of KRS 65.117, which prohibits any city, county, urban-county, consolidated local government, charter county, special district, or taxing district from entering into any financing obligation of any nature, except leases under $200,000, without first notifying the state local debt officer in writing. This form shall also serve as application for approval of debt issuance when applicable. An electronic version of the form is available at www.dlg.ky.gov.

✓ Type of debt to be issued (must check one):	SLDO Approval Required	Complete Sections
☐ Short Term Borrowing - KRS 65.7701 et seq.	No	A, B, C
☐ Lease from $200,000 - $500,000 - KRS 65.940 et seq.	No	A, B, D
☐ Lease exceeding $500,000 - KRS 65.940 et seq.	Yes (Counties only)	A, B, D
☐ General Obligation Bond - KRS Chapter 66	Yes (Counties only)	A, B, E
☐ Public Project Rev. Bond - KRS Chapter 58	No	A, B, E
☐ Public Project Rev. Bond w/Lease - KRS 66.310(2)	Yes (Counties only)	A, B, D, E
☐ Industrial Revenue Bond - KRS Chapter 103	Yes (All Borrowers)	A, B, F
☐ Other Bonds (True Revenue, Utility Assessment, TIF)	No	A, B, E
X Loan from Kentucky Infrastructure Authority - KRS Chapter 224A		

Section A - Borrower Information

Agency Name	Bracken County Water District		
Governing Body	Board of Commissioners		
Street Address	1324 Brooksville-Germantown Road, Brooksville, Kentucky		
P.O. Box #	201	City	Brooksville
County	Bracken	Zip	41004
Authorized Official	Anthony Hamberhl, Chairman		

Section B - Terms of Financial Obligation

Please provide all relevant information. Fields in **bold** are mandatory.

Principle Amount:	358,000	**Date of Issue:**	06/30/2015
Maturity Date(s):	12/31/2035	**Payment Schedule:** (must attach schedule)	Not yet available
Term:	20 years from loan closing	**Number of Renewal Periods:**	0
Interest Rate(s):	1.75	**Type of Interest (fixed or variable):**	Fixed
Retirement Method:	From water system revenues		
Lender's Name:	Kentucky Infrastructure Authority		
Lender's Address:	1024 Capital Center Drive, Suite 340, Frankfort, Kentucky 40601		
Right of Termination:	Not Applicable		
Termination Penalties:	Not Applicable		
Prepayment Provisions:	May prepay & retire entire amount at any time without penalty upon five days advance written notice		
Trustee or Paying Agent:	None		
AOC Funded Percentage:	0.00		

NOTIFICATION OF INTENT TO FINANCE AND APPLICATION FOR DEBT APPROVAL

Form # SLDO-1
Revised 1/1/2011

Section C - Note (Loan) Information/Documentation

Purpose - Briefly explain the documented need that necessitates this note (loan) and the public purpose it is intended to address. (Attach additional information if necessary):

Proceeds from loan will be used to finance the replacement of approximately 8,500 feet of four-inch asbestos cement water main that Bracken District installed in the 1960's during the original construction of its water distribution system with eight-inch polyvinyl chloride water mains.

Pledge of Taxes/Description:

None

Pledge of Revenue/Description:

Water System revenues will be used to repay borrowed funds

Pledge of Project Revenues (Attach documentation which substantiates the revenue projections):

Documentation prepared by KIA is attached.

Have bids been sought by the local governments to determine the financial and programmatic competitiveness of the note (loan) proposal? ○ Yes ◉ No

If No, explain what steps were taken to ensure adequate competition.

Loan was obtained from the Kentucky Infrastructure Authority pursuant to KRS Chapter 224A

Required Attachments

1. Certification from local government attesting to the ability to meet additional financial commitments necessitated by the note and statement as to taxes and revenues to be collected during the term of the note.

Section D - Lease Information/Documentation

Describe the real or personal property to be acquired or constructed:

Not applicable to the proposed transaction

Type of Lease : ☐ General Obligation ☐ Revenue

Is Lease Annually Renewable? ○ Yes ○ No

Does Agency seek approval without a hearing? ○ Yes ○ No Justification: ☐ Revenue ☐ Refunding

If yes, must attach certification from counsel regarding county obligation.

Does this lease refund a prior lease? ○ Yes ○ No

If yes, please state the name, date and principal amount of original issue(s) being refunded:

Required Attachments (If lease requires SLDO approval)

1. Minutes from the local public hearing
2. Affidavit of publication of SLDO hearing (if hearing is required) and newspaper advertisement tear sheet
3. Copy of lease
4. Executed copy of ordinance/resolution of fiscal court authorizing the lease
5. Certification from local government attesting to the ability to meet additional financial commitments necessitated by the lease and statement as to taxes and revenues to be collected during the term of the lease.

Please continue to the next page

NOTIFICATION OF INTENT TO FINANCE AND APPLICATION FOR DEBT APPROVAL

Form # SLDO-1
Revised 1/1/2011

Section E - Bond Information/Documentation

Please provide all relevant information. Fields in **bold** are mandatory

Describe the purpose of the bond:

NOT APPLICABLE - Bracken County Water District will not be issuing any bonds

Bond Counsel:

Counsel Address:

Financial Advisor:

Advisor Address:

Bond Series:

Call Date:

Does this bond refund a prior bond? ○ Yes ○ No

If yes, please state the name, date and principal amount of original issue(s) being refunded:

Required Attachments (If SLDO Approval is Required)

1. Minutes from the local public hearing
2. Affidavit of publication of SLDO hearing and newspaper advertisement tear sheet
3. Executed copy of ordinance/resolution of fiscal court authorizing financial plan for the issuance of the bonds
4. Proposed plan of financing
5. Preliminary official statement (if applicable)
6. Sources and uses table

Additional Required Attachments for KRS Chapter 103 Bonds

1. Documentation in an appropriate form substantiating the project's eligibility under KRS 103.2101(1)(a)-(e).
2. If the project requires approval of the reduction in property taxes, attach any documentation provided to agency responsible for approval.

******

By signing below, the Authorized Official certifies that the foregoing is true and accurate to the best of his or her knowledge.

Name (please print) Anthony Habermehl	Date: 05/20/2015
Title: Chairman	Signature:

Mail to:
Department for Local Government
Attn: State Local Debt Officer
1024 Capital Center Drive, Suite 340
Frankfort, KY 40601

Fax to: 502-573-3712

	Population				Unemployment	
Year	City	% Change	County	% Change	Date	Rate
1980	680		7,738		June 2004	4.9%
1990	670	-1.5%	7,766	0.4%	June 2009	12.2%
2000	589	-12.1%	8,279	6.6%	June 2013	9.5%
2010	642	9.0%	8,488	2.5%	June 2014	7.2%
Current	468	-27.1%	8,488	0.0%		
Cumulative %		-31.2%		9.7%		

VIII. FINANCIAL ANALYSIS (See Exhibit 1)

Financial information was obtained from the audited financial statements for the years ended December 31, 2012 and 2013 with the amounts for 2014 being estimated. Percentage references in the History section below are based on whole dollar amounts and not the rounded amounts presented.

HISTORY

Revenues decreased 10% from $1.6 million in 2012 to $1.5 million in 2014. Operating expenses increased 13% from $767 thousand to $866 thousand. The increase is due to an 10% purchased water cost increase and a 16% other operating expense increase (compensation and maintenance increases). The debt coverage ratio was 2.1, 1.6 and 1.5 for 2012 through 2014, respectively.

The balance sheet reflects a current ratio of 2.3, a debt to equity ratio of 0.6 and unrestricted cash equals 8.5 months of operating expenses.

PROJECTIONS

Projections are based on the following assumptions:

1) Revenues increase .5% in 2014 increase due to a rate to offset purchased water cost but remain flat thereafter.
2) Purchased water expenses increase 2.5% in 2014 then remain flat thereafter.
3) Operating expenses increase 2% each year for inflation.
4) Debt service coverage is 1.4 in 2016 when principal and interest repayments begin.

Based on the proforma assumptions, the utility shows adequate cash flow to repay the KIA Fund B loan.

REPLACEMENT RESERVE

The annual replacement cost is $900. This amount should be added to the replacement account each December 1 until the balance reaches $9,000 and maintained for the life

BRACKEN COUNTY WATER DISTRICT
FINANCIAL SUMMARY (DECEMBER YEAR END)

	Audited 2012	Audited 2013	Projected 2014	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019
Balance Sheet								
Assets								
Current Assets	950,554	901,197	905,085	905,085	905,085	905,085	905,085	905,085
Other Assets	11,992,711	12,133,366	12,041,951	12,289,396	12,149,782	11,987,157	11,806,790	11,604,851
Total	12,943,265	13,034,563	12,947,036	13,194,481	13,054,867	12,892,242	12,711,875	12,509,936
Liabilities & Equity								
Current Liabilities	339,492	386,529	394,845	402,085	415,491	424,068	436,268	448,468
Long Term Liabilities	4,723,888	4,624,494	4,331,622	4,438,460	4,183,992	3,921,147	3,646,302	3,359,457
Total Liabilities	5,063,380	5,011,023	4,726,467	4,840,545	4,599,483	4,345,215	4,082,570	3,807,925
Net Assets	7,879,885	8,023,540	8,220,569	8,353,936	8,455,384	8,547,027	8,629,305	8,702,011
Cash Flow								
Revenues	1,640,120	1,486,301	1,495,838	1,495,838	1,495,838	1,495,838	1,495,838	1,495,838
Operating Expenses	767,278	866,409	885,665	895,478	906,387	916,596	927,010	937,632
Other Income	28,959	17,911	18,600	18,600	18,600	18,600	18,600	18,600
Cash Flow Before Debt Service	901,801	637,803	628,773	618,960	608,051	597,842	587,428	576,806
Debt Service								
Existing Debt Service	428,393	395,179	420,010	419,337	417,429	421,281	419,659	421,659
Propesed KIA Loan	0	0	0	0	22,008	22,008	22,008	22,008
Total Debt Service	428,393	395,179	420,010	419,337	439,437	443,289	441,667	443,667
Cash Flow After Debt Service	473,408	242,624	208,763	199,623	168,614	154,553	145,761	133,139
Ratios								
Current Ratio	2.8	2.3	2.3	2.3	2.2	2.1	2.1	2.0
Debt to Equity	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4
Days Sales in Accounts Receivable	47.9	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Months Operating Expenses in Unrestricted Cash	10.5	8.7	8.5	8.4	8.4	8.3	8.2	8.1
Debt Coverage Ratio	2.1	1.6	1.5	1.5	1.4	1.3	1.3	1.3

EXHIBIT 17

Detailed Estimate of Acquired Property, Arranged According To The Uniform Systems of Accounts For Class A/B Water Districts and Associations

Account No.	Account Description	Estimate
311	Pumping Equipment	$ 31,450
331	Transmission and Distribution Mains	$ 55,350
334	Meter and Meter Installations	$ 1,000
335	Hydrants	$ 3,800
	TOTAL	**$ 91,600**