CALL NO. 324

CONTRACT ID. 231305

MADISON COUNTY

FED/STATE PROJECT NUMBER FD04 076 0421 009-010

DESCRIPTION BATTLEFIELD MEMORIAL HIGHWAY (US 421)

WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE

PRIMARY COMPLETION DATE 8/1/2023

LETTING DATE: January 26,2023

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME January 26,2023. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

REQUIRED BID PROPOSAL GUARANTY: Not less than 5% of the total bid.

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PART I

SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 07

CONTRACT ID - 231305

FD04 076 0421 009-010

COUNTY - MADISON

PCN - DE07604212264
FD04 076 0421 009-010

BATTLEFIELD MEMORIAL HIGHWAY (US 421) CONSTRUCT LEFT TURN LANE ON US 421 INTO THE KINGSTON ELEMENTARY SCHOOL, A DISTANCE OF 0.12 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 07-80101.00.

GEOGRAPHIC COORDINATES LATITUDE 37:38:54.00 LONGITUDE 84:14:20.00

ADT 6,950

COMPLETION DATE(S):

COMPLETED BY 08/01/2023 APPLIES TO ENTIRE CONTRACT - SEE SPECIAL NOTE

CONTRACT NOTES

PROPOSAL ADDENDA

All addenda to this proposal must be applied when calculating bid and certified in the bid packet submitted to the Kentucky Department of Highways. Failure to use the correct and most recent addenda may result in the bid being rejected.

BID SUBMITTAL

Bidder must use the Department's electronic bidding software. The Bidder must download the bid file located on the Bid Express website (www.bidx.com) to prepare a bid packet for submission to the Department. The bidder must submit electronically using Bid Express.

JOINT VENTURE BIDDING

Joint venture bidding is permissible. All companies in the joint venture must be prequalified in one of the work types in the Qualifications for Bidders for the project. The bidders must get a vendor ID for the joint venture from the Division of Construction Procurement and register the joint venture as a bidder on the project. Also, the joint venture must obtain a digital ID from Bid Express to submit a bid. A joint bid bond of 5% may be submitted for both companies or each company may submit a separate bond of 5%.

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. When prescribed in said directives, the contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom shall be contacted through their individual Protection Notification Center. Non-compliance with these directives can result in the enforcement of penalties.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

Pursuant to KRS 176.085(1)(b), an agency, department, office, or political subdivision of the Commonwealth of Kentucky shall not award a state contract to a person that is a foreign entity required by KRS 14A.9-010 to obtain a certificate of authority to transact business in the Commonwealth ("certificate") from the Secretary of State under KRS 14A.9-030 unless the person produces the certificate within fourteen (14) days of the bid or proposal opening. If the foreign entity is not required to obtain a certificate as provided in KRS 14A.9-010, the foreign entity should identify the applicable exception. Foreign entity is defined within KRS 14A.1-070.

For all foreign entities required to obtain a certificate of authority to transact business in the Commonwealth, if a copy of the certificate is not received by the contracting agency within the time frame identified above, the foreign entity's solicitation response shall be deemed non-responsive or the awarded contract shall be cancelled.

Businesses can register with the Secretary of State at https://secure.kentucky.gov/sos/ftbr/welcome.aspx .

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

Questions about projects during the advertisement should be submitted in writing to the Division of Construction Procurement. This may be done by fax (502) 564-7299 or email to kytc.projectquestions@ky.gov. The Department will attempt to answer all submitted questions. The Department reserves the right not to answer if the question is not pertinent or does not aid in clarifying the project intent.

The deadline for posting answers will be 3:00 pm Eastern Daylight Time, the day preceding the Letting. Questions may be submitted until this deadline with the understanding that the later a question is submitted, the less likely an answer will be able to be provided.

The questions and answers will be posted for each Letting under the heading "Questions & Answers" on the Construction Procurement website (www.transportation.ky.gov/contract). The answers provided shall be considered part of this Special Note and, in case of a discrepancy, will govern over all other bidding documents.

HARDWOOD REMOVAL RESTRICTIONS

The US Department of Agriculture has imposed a quarantine in Kentucky and several surrounding states, to prevent the spread of an invasive insect, the emerald ash borer. Hardwood cut in conjunction with the project may not be removed from the state. Chipping or burning on site is the preferred method of disposal.

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

Identification of excess material sites and borrow sites shall be the responsibility of the Contractor. The Contractor shall be responsible for compliance with all applicable state and federal laws and may wish to consult with the US Fish and Wildlife Service to seek protection under Section 10 of the Endangered Species Act for these activities.

ACCESS TO RECORDS

The contractor, as defined in KRS 45A.030 (9) agrees that the contracting agency, the Finance and Administration Cabinet, the Auditor of Public Accounts, and the Legislative Research Commission, or their duly authorized representatives, shall have access to any books, documents, papers, records, or other evidence, which are directly pertinent to this contract for the purpose of financial audit or program review. Records and other prequalification information confidentially

disclosed as part of the bid process shall not be deemed as directly pertinent to the contract and shall be exempt from disclosure as provided in KRS 61.878(1)(c). The contractor also recognizes that any books, documents, papers, records, or other evidence, received during a financial audit or program review shall be subject to the Kentucky Open Records Act, KRS 61.870 to 61.884.

In the event of a dispute between the contractor and the contracting agency, Attorney General, or the Auditor of Public Accounts over documents that are eligible for production and review, the Finance and Administration Cabinet shall review the dispute and issue a determination, in accordance with Secretary's Order 11-004.

BUILD AMERICA, BUY AMERICA ACT (BABA)

On November 15, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act (IIJA), Pub. L. No. 117-58, includes the Build America, Buy America Act ("the Act"). Pub. L. No. 117-58, §§70901-52. The Act strengthens the Buy America preference to include "construction materials." The current temporary waiver for **"construction materials"** will expire on November 10, 2022.

The Act will apply to construction materials as outlined in the guidance issued in OMB M-22-11.

Construction Materials – Includes an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that is or consists primarily of:

- Non-ferrous metals
- Plastic/polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- Glass (including optic glass);
- Lumber; or
- Drywall.

Construction Materials only applies to items, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project.

Construction Materials does not apply to tools, equipment or supplies brought to the jobsite and removed before completion.

SPECIAL NOTE FOR RECIPROCAL PREFERENCE

RECIPROCAL PREFERENCE TO BE GIVEN BY PUBLIC AGENCIES TO RESIDENT BIDDERS

By reference, KRS 45A.490 to 45A.494 are incorporated herein and in compliance regarding the bidders residency. Bidders who want to claim resident bidder status should complete the Affidavit for Claiming Resident Bidder Status along with their bid in the electronic bidding software. Submittal of the Affidavit should be done along the bid in Bid Express.

April 30, 2018

ASPHALT MIXTURE

Unless otherwise noted, the Department estimates the rate of application for all asphalt mixtures to be 110 lbs/sy per inch of depth.

INCIDENTAL SURFACING

The Department has included in the quantities of asphalt mixtures established in the proposal estimated quantities required for resurfacing or surfacing mailbox turnouts, farm field entrances, residential and commercial entrances, curve widening, ramp gores and tapers, and road and street approaches, as applicable. Pave these areas to the limits as shown on Standard Drawing RPM-110-06 or as directed by the Engineer. In the event signal detectors are present in the intersecting streets or roads, pave the crossroads to the right of way limit or back of the signal detector, whichever is the farthest back of the mainline. Surface or resurface these areas as directed by the Engineer. The Department will not measure placing and compacting for separate payment but shall be incidental to the Contract unit price for the asphalt mixtures.

OPTION B

Be advised that the Department will control and accept compaction of asphalt mixtures furnished on this project under OPTION B in accordance with Sections 402 and 403.

7-80101.00
SPECIAL NOTE
FOR
FIXED START AND COMPLETION DATE

Project Construction Schedule

The contractor shall not begin the roadway work prior to May 15, 2023. The utility relocation work does not have fixed start date. The utility relocation work shall not adversely affect, at the discretion of the Engineer, the ingress and egress at the Kingston Elementary School prior to summer break. The total project has a fixed completion date of August 1, 2023.

KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF RIGHT OF WAY & UTILITIES

TC 62-226
Rev. 01/2016
Page 1 of 1

RIGHT OF WAY CERTIFICATION

☐ Original	☐ Re-Certification	RIGHT OF WAY CERTIFICATION	
ITEM #	**COUNTY**	**PROJECT # (STATE)**	**PROJECT # (FEDERAL)**
7-80101.00	Madison	1100 FD04 076 12739001R	N/A
PROJECT DESCRIPTION			
US 421 - Battlefield Memorial Highway - Project to construct turn lane Kingston Elementary School			

☐ **No Additional Right of Way Required**

Construction will be within the limits of the existing right of way. The right of way was acquired in accordance to FHWA regulations under the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970, as amended. No additional right of way or relocation assistance were required for this project.

☒ **Condition # 1 (Additional Right of Way Required and Cleared)**

All necessary right of way, including control of access rights when applicable, have been acquired including legal and physical possession. Trial or appeal of cases may be pending in court but legal possession has been obtained. There may be some improvements remaining on the right-of-way, but all occupants have vacated the lands and improvements, and KYTC has physical possession and the rights to remove, salvage, or demolish all improvements and enter on all land. Just Compensation has been paid or deposited with the court. All relocations have been relocated to decent, safe, and sanitary housing or that KYTC has made available to displaced persons adequate replacement housing in accordance with the provisions of the current FHWA directive.

☐ **Condition # 2 (Additional Right of Way Required with Exception)**

The right of way has not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. Some parcels may be pending in court and on other parcels full legal possession has not been obtained, but right of entry has been obtained, the occupants of all lands and improvements have vacated, and KYTC has physical possession and right to remove, salvage, or demolish all improvements. Just Compensation has been paid or deposited with the court for most parcels. Just Compensation for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract

☐ **Condition # 3 (Additional Right of Way Required with Exception)**

The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. All remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. KYTC is hereby requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary right of way will not be fully acquired, and/or some occupants will not be relocated, and/or the just compensation will not be paid or deposited with the court for some parcels until after bid letting. KYTC will fully meet all the requirements outlined in 23 CFR 635.309(c)(3) and 49 CFR 24.102(j) and will expedite completion of all acquisitions, relocations, and full payments after bid letting and prior to AWARD of the construction contract or force account construction.

Total Number of Parcels on Project	3	EXCEPTION (S) Parcel #	ANTICIPATED DATE OF POSSESSION WITH EXPLANATION
Number of Parcels That Have Been Acquired			
Signed Deed	2		
Condemnation	1		
Signed ROE	1		

Notes/ Comments (Text is limited. Use additional sheet if necessary.)

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	Cecil Smith
Signature		Signature	Digitally signed by Cecil D. Smith Date: 2022.10.24 15:35:13 -04'00'
Date		Date	10/24/2022
Right of Way Director		**FHWA**	
Printed Name	2022.10.25	Printed Name	
Signature	10:00:36	Signature	
Date	-04'00'	Date	

UTILITIES AND RAIL CERTIFICATION NOTE

Madison County
FD04 076 1273901U
Mile point: 9.670 TO 9.741
ADD A LEFT TURN LANE ON US 421 INTO THE KINGSTON ELEMENTARY SCHOOL (2020CCN)
ITEM NUMBER: 07-80101.00

PROJECT NOTES ON UTILITIES

For all projects under 2000 Linear feet which require a normal excavation locate request pursuant to KRS 367.4901-4917, the awarded contractor shall field mark the proposed excavation or construction boundaries of the project (also called white lining) using the procedure set forth in KRS 367.4909(9)(k). For all projects over 2000 linear feet, which are defined as a "Large Project" in KRS 367.4903(18), the awarded contractor shall initially mark the first 2000 linear feet minimally of proposed excavation or construction boundaries of the project to be worked using the procedure set forth in KRS 367.4909(9)(k). This temporary field locating of the project excavation boundary shall take place prior to submitting an excavation location request to the underground utility protection Kentucky Contact Center. For large projects, the awarded contractor shall work with the impacted utilities to determine when additional white lining of the remainder of the project site will take place. This provision shall not alter or relieve the awarded contractor from complying with requirements of KRS 367.4905 to 367.4917 in their entirety.

Please Note: The information presented in this Utility Note is informational in nature and the information contained herein is not guaranteed.

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work proposed, it is unlikely to conflict with the existing utilities beyond minor facility adjustments. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Resident Engineer. The Kentucky Transportation Cabinet maintains the right to remove or alter portions of this contract if a utility conflict occurs. The utility facilities as noted in the previous section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request

UTILITIES AND RAIL CERTIFICATION NOTE

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does not relieve the contractor from the responsibility of contacting non-member facility owners, whom are to be contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

NOTE: DO NOT DISTURB THE FOLLOWING FACILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS

Not Applicable

The Contractor is fully responsible for protection of all utilities listed above

THE FOLLOWING FACILITY OWNERS ARE RELOCATING/ADJUSTING THEIR FACILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

Not Applicable

THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE OWNER OR THEIR SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT

Madison County Utilities District – Water

Delta Natural Gas Company, Inc. - Natural Gas

Kentucky Utilities – Electric

Charter Communications dba Spectrum – CATV

All above utilities are expected to be relocated by **March 1, 2023.**

THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE ROAD CONTRACTOR AS INCLUDED IN THIS CONTRACT

Not Applicable

UTILITIES AND RAIL CERTIFICATION NOTE

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RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

☒ **No Rail Involvement** ☐ **Rail Involved** ☐ **Rail Adjacent**

UTILITIES AND RAIL CERTIFICATION NOTE

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AREA FACILITY OWNER CONTACT LIST

Facility Owner	Address	Contact Name	Phone	Email
Charter DBA Spectrum - CATV	1617 Foxhaven Dr Richmond KY 40475	R. Steven Smith	8596264809	rsteven.smith@charter.com
Delta Natural Gas Company, Inc. - Natural Gas	3617 Lexington Road Winchester KY 40391	Steve Lewis	8597446171	slewis@DeltaGas.com
Kentucky Utilities - Electric	820 W. Broadway Louisville KY 40202	Caroline Justice	5026273708	Caroline.Justice@lge-ku.com
Madison County Utilities District - Water	PO Box 670 Richmond KY 40475	Jared Webb	8596241735	jwebb@madisoncountyutilities.com

GENERAL UTILITY NOTES AND INSTRUCTIONS APPLICABLE TO ALL UTILITY WORK MADE A PART OF THE ROAD CONSTRUCTION CONTRACT

The contractor should be aware the following utility notes and KYTC Utility Bid Item Descriptions shall supersede, replace and take precedence over any and all conflicting information that may be contained in utility owner supplied specifications contained in the contract, on plans supplied by the utility owner, or any utility owner specifications or information externally referenced in this contract.

Where information may have been omitted from these notes, bid item descriptions, utility owner supplied specifications or plans; the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

PROTECTION OF EXISTING UTILITIES

The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.

PREQUALIFIED UTILITY CONTRACTORS

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner**. Utility contractors may be added via addendum if KYTC is instructed to do so by the utility owner. Potential contractors must seek prequalification from the utility owner. Any revisions must be sent from the utility owner to KYTC a minimum of one week prior to bid opening.** Those utility owners with a prequalification or preapproval requirement are as follows:

Madison County Utilities District has selected the following as preapproved contractors to perform the water line project:

- *Thomas Construction, Inc.*
- *Southern Contractor of KY, LLC*
- *Akins Excavating Co. Inc.*

The bidding contractor needs to review the above list and choose from the list of approved subcontractors at the end of these general notes as identified above before bidding. When the list of approved subcontractors is provided, only subcontractors shown on the following list(s) will be allowed to work on that utility as a part of this contract. In such instances, the utility subcontractor is not required to be prequalified with the KYTC Division of Construction Procurement.

IF A UTILITY SUPPLIED CONTRACTOR LIST IS NOT PROVIDED

When the above list of approved subcontractors for the utility work is not provided, the utility work can be completed by the prime contractor, or a prime contractor-chosen subcontractor. In such instances, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

All utility work is being performed as a part of a contract administered by KYTC; there is not a direct contract between the utility contractor and utility owner. The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which may also be supplied to the utility owner by the contractor to expedite handling of items like material approvals and shop drawings. All approvals and correspondence generated by the utility owner shall be directed to the KYTC Section Engineer. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. At no time shall any direct communication between the utility owner and utility contractor without the communication flowing through the KYTC Section Engineer be considered official and binding under the contract.

ENGINEER

Where the word "Engineer" appears in any utility owner specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet (KYTC) Section Engineer or designated representative and the utility owner engineer or designated representative jointly. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

Where the word "Inspector" or "Resident Project Representative" appears in the utility specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the "Inspector" or "Resident Project Representative" is the utility owner inspector and KYTC inspector jointly. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

NOTICE TO UTILITY OWNERS OF THE START OF WORK

One month before construction is to start on a utility, the utility contractor shall make notice to the KYTC Section Engineer and the utility owner of when work on a utility is anticipated to start. The utility contractor shall again make confirmation notice to the KYTC Section Engineer and the utility owner one week before utility work is to actually start.

UTILITY SHUTDOWNS

The Contractor shall not shut down any active and in-service mains, utility lines or services for any reason unless specifically given permission to do so by the utility owner. The opening and closing of valves and operating of other active utility facilities for main, utility line or utility service shut downs are to be performed by the utility owner unless specific permission is given to the contractor by the owner to make shutdowns . If and when the utility owner gives the contractor permission to shutdown mains, utility lines or utility services, the contractor shall do so following the rules, procedures and regulations of the utility owner. Any permission given by the utility owner to the contractor to shutdown active and in-service mains, utility lines or services shall be communicated to the KYTC Section Engineer by the utility owner that such permission has been given.

Notice to customers of utility shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact, or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner's shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment may include, but is not limited to, digging down on a water or gas main at the tap to turn off the tap valve

or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

RESTORATION

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be "in-kind" as existing.

Restoration of seed and sod areas will be measured and paid under the appropriate seeding and sodding bid items established in the contract for roadway work.

BELOW ARE NOTES FOR WHEN "INST" ITEMS ARE IN THE CONTRACT MEANING THE UTILITY COMPANY IS PROVIDING CERTAIN MATERIALS FOR UTILITY RELOCATION

MATERIAL

Contrary to Utility Bid Item Descriptions, those bid items that have the text **"Inst"** at the end of the bid item will have the major components of the bid item provided by the utility owner. No direct payment will be made for the major material component(s) supplied by the utility company. All remaining materials required to construct the bid item as detailed in utility bid item descriptions, in utility specifications and utility plans that are made a part of this contract will be supplied by the contractor. The contractor's bid price should reflect the difference in cost due to the provided materials.

The following utility owners have elected to provide the following materials for work under this contract:

> ***"No materials are being supplied by the utility owner(s). All materials are to be supplied by the contractor per bid item descriptions, utility specifications and utility plans."***

SECURITY OF SUPPLIED MATERIALS

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of

the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

Standard Water Bid Item Descriptions

W AIR RELEASE VALVE This bid item description shall apply to all air release valve installations of every size except those defined as "Special". This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release valve would a separate bid item be established. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

BOLLARDS This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND

W CAP EXISTING MAIN This item shall include the specified cap, concrete blocking and/or mechanical anchoring, labor, equipment, excavation, backfill, and restoration required to install the cap at the location shown on the plans or as directed in accordance with the specifications. This item is not to be paid on new main installations. This pay item is only to be paid to cap existing mains. Caps on new mains are incidental to the new main. Any and all caps on existing mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of water main under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT CONCRETE Includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, and etc., to construct the concrete encasement of the water main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL OPEN CUT This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W FIRE HYDRANT ADJUST Includes all labor, equipment, excavation, materials, and backfill to adjust the existing fire hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. This also includes allowing for the utility owner inspector to inspect the existing fire hydrant prior to adjusting, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W FIRE HYDRANT ASSEMBLY Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings compete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's

Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT RELOCATE This item includes all labor and equipment to remove the existing fire hydrant from its existing location and reinstalling at a new location. This item shall include a new isolating valve and valve box, concrete pad around valve box (when required in specifications or plans), new piping, new anchoring tee, anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, excavation, and backfill as indicated on plans, specifications, and on standard drawings compete and ready for use. This item shall also include allowing for utility owner inspector to inspect the existing fire hydrant prior to reuse, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant for use, if the existing fire hydrant is determined unfit for reuse. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT REMOVE This bid item includes removal of an abandoned fire hydrant, isolating valve, and valve box to the satisfaction of the engineer. The removed fire hydrant, isolating valve and valve box shall become the property of the contractor for his disposal as salvage or scrap. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSH HYDRANT ASSEMBLY This item shall include the flushing hydrant assembly, service line, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flush hydrant at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSHING ASSEMBLY This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W LEAK DETECTION METER This item is for payment for installation of a water meter at main valve locations where shown on the plans for detection of water main leaks. The meter shall be of the size and type specified in the plans or specifications. This item shall include all labor, equipment, meter, meter box or vault, connecting pipes between main and meter, main taps, tapping saddles, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. No separate payment will be made under any other contract item for connecting pipe or main taps. Any and all leak detection meters shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W LINE MARKER This item is for payment for furnishing and installing a water utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

W LINE STOP SIZE 1 OR 2: This item shall include the line stop saddle/sleeve, valve, completion plug and any other material, labor, and equipment necessary to complete the line stop as indicated in the plans and/or specifications. This installation shall allow the waterline system to operate as usual without any interruption of service. The size shall be the measured internal diameter of the live pipe to be tapped. The line stop size to be

paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches
Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing water main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Water Main Relocate shall not be paid on a linear feet basis; but, shall be Paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER This item is for payment for installation of all standard water meters of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER ADJUST This item includes all labor, equipment, excavation, materials, backfill, restoration, and etc., to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER RELOCATE This item includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, and etc., to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, and etc., from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The new service pipe (if required) will be paid under short side or long side service bid items. Any and all meter relocations of 2 inches or less shall be paid under one bid item included in the contract regardless of size. Each individual relocation shall be paid individually under this item; however, no separate bid items will be established for meter size variations of 2 inches ID or less. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER VAULT SIZE RANGE 1 OR 2 This item is for payment for installation of an underground structure for housing of a larger water meter, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s) valve(s), all piping, and fitting materials associated with installing a functioning meter and vault in accordance with the plans, standard drawings, and specifications, complete and ready for use. The size shall be the measured internal diameter of the meter and piping to be installed. The size meter vault to be paid under size 1 or 2 shall be as follows:

Size Range 1 = All meter and piping sizes greater than 2 inches up to and including 6 inches
Size Range 2 = All meter and piping sizes greater than 6 inches

This item shall be paid EACH (EA) when complete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER/FIRE SERVICE COMBO VAULT This item is for payment for installation of an underground structure for housing of a water meter and fire service piping, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s), valve(s), all piping, and fitting materials associated with installing a functioning meter and fire service vault in accordance with the plans and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER WITH PRESSURE REDUCING VALVE (PRV) This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, PRV, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter with PRV in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W PIPE This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This item shall include all temporary and permanent materials and equipment required to pressure test and sanitize mains including, but not limited to, pressurization pumps, hoses, tubing, gauges, main taps, saddles, temporary main end caps or plugs and blocking, main end taps for flushing, chlorine liquids or tablets for sanitizing, water for testing/sanitizing and flushing (when not supplied by the utility), chlorine neutralization equipment and materials, and any other items needed to accomplish pressure testing and sanitizing the main installation. This item shall also include pipe anchors, at each end of polyethylene pipe runs when specified to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W PLUG EXISTING MAIN This item shall include the specified plug, concrete blocking and/or anchoring, labor, equipment, excavation, backfill, and restoration required to install the plug in an existing in-service main that is to remain at the location shown on the plans or as directed in accordance with the specifications. Any and all plugs on all existing in-service mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: This utility bid item is not to be paid on new main installations or abandoned mains. This pay item is to plug existing in-service mains only. Plugs on new mains are incidental to the new main just like all other fittings.

NOTE: Plugging of existing abandon mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications For Road And Bridge Construction and paid using Bid Code 01314 Plug Pipe.

W PRESSURE REDUCING VALVE This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W PUMP STATION This item is for payment for installation of pumps and an above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

W REMOVE TRANSITE (AC) PIPE This item shall include all labor, equipment, and materials needed for removal and disposal of the pipe as hazardous material. All work shall be performed by trained and certified personnel in accordance with all environmental laws and regulations.
Any and all transite AC pipe removed shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W SERVICE LONG SIDE This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, tapping saddle (if required), and corporation stop materials, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE SHORT SIDE This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill,

testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations were both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE RELOCATE This item is for the relocation of an existing water service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE ABANDONMENT This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., abandonment of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., removal of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TAPPING SLEVE AND VALVE SIZE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches
Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TIE-IN This bid description shall be used for all main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the water main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. This item shall be paid EACH (EA) when complete.

W VALVE This description shall apply to all valves of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for gate or butterfly valves being installed with new main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, disinfection, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, valves shall be restrained. Valve restraint shall be considered incidental to the valve and adjoining pipe. This description does not apply to cut-in valves. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE ANCHOR EXISTING This bid item is intended to pay for installation of restraint hardware on an existing valve where no restraint exists to hold the valve in place to facilitate tie-ins and other procedures where restraint is prudent. This work shall be performed in accordance with water specifications and plans. This bid item shall include all labor equipment, excavation, materials and backfill to complete restraint of the designated valve, regardless of size, at the location shown on the plans, complete and ready for use. Materials to be provided may include, but is not limited to, retainer glands, lugs, threaded rod, concrete, reinforcing steel or any other material needed to complete the restraint. Should the associated valve box require removal to complete the restraint, the contractor shall reinstall the existing valve box, the cost of which shall be considered incidental to this bid item. No separate bid items are being provided for size variations. All sizes shall be paid under one bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE BOX ADJUST Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE CUT-IN This bid description is for new cut-in valve installations of all sizes where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations shown on the plans, or as directed by the engineer, complete and ready for use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE VAULT This item is for payment for installation of an underground structure for housing of specific valve(s) as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or doors, the specified valve(s), all piping, and fitting materials associated with installing a functioning valve vault in accordance with the plans, standard drawing, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

Madison County Utilities District

STANDARDS, SPECIFICATIONS AND DETAILS FOR WATER MAIN DESIGN & CONSTRUCTION

November 2014

Madison County Utilities District

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Madison County Utilities District

I. Purpose

Madison County Utilities District Standards, Specifications & Details

The purpose of these Standards, Specifications & Details is to provide standards for design and Construction of water extensions constructed through Developer Agreements. These Standards shall be utilized by the Developer's Engineer and Contractor.

Madison County Utilities District

II. GENERAL CONDITIONS

1. DEFINITIONS

1.1 CONTRACT DOCUMENTS - The Contract documents consist of the DEVELOPER AGREEMENT, the DRAWINGS, and SPECIFICATIONS.

1.2 CONTRACTOR - The person, firms, or corporation with whom the DEVELOPER has executed the Construction Contract.

1.3 DEVELOPER – The person, firm or corporation who is responsible for the development of the property which will require construction of new or upgraded Water Lines.

1.4 DEVELOPER'S ENGINEER – The person, firm or corporation under contract with the DEVELOPER to prepare DRAWINGS.

1.5 DRAWINGS - The parts 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.

1.6 ENGINEER - The person, firm, or corporation under contract with the DISTRICT to review DRAWINGS and give recommendations.

1.7 OWNER or DISTRICT – Madison County Utilities District for whom the WORK is to be performed.

1.8 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.9 INSPECTOR - The authorized representative of the ENGINEER or DISTRICT who is assigned to the observe and inspect construction of the water lines on a project site or any part thereof.

1.10 SHOP DRAWINGS - All drawings, diagrams, illustration, 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.

1.11 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS, Madison County Utilities Standards, Specifications and Details for water main and Construction.

1.12 SUBCONTRACTOR - An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.13 SUBSTANTIAL COMPLETION - That date 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.

1.14 SUPPLIER - Any person or organization who supplies material or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.15 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.16 WRITTEN NOTICE - 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 their last given address, or delivered in person to said party or their authorized representative on the WORK.

1.17. ***No Project work shall be done on Weekends or Holiday's when Utility is closed.***

2. **ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS**

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the DEVELOPER'S ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 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.

3. **DRAWINGS AND SPECIFICATIONS**

3.1 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 DISTRICT.

3.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the ***SPECIFICATIONS*** shall govern. Figure dimensions on DRAWINGS shall govern over general DRAWINGS.

3.3 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, DISTRICT and DEVELOPER'S ENGINEER, **in writing**, or shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after discovery of such discrepancies, inconsistencies or ambiguities shall be done at the
CONTRACTOR'S risk.

4. SHOP DRAWINGS

4.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the

prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER & DISTRICT shall promptly review all SHOP DRAWINGS. The ENGINEER'S and DISTRICT'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a **CHANGE ORDER.**

4.2 When submitted for the ENGINEER'S and DISTRICT'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

4.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER & DISTRICT. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER & DISTRICT.

5. MATERIALS, SERVICES AND FACILITIES

5.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK.

5.2 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.

5.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

5.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

5.5 Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

6. INSPECTION AND TESTING

6.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

6.2 The DISTRICT shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

6.3 The CONTRACTOR shall provide at the CONTRACTOR'S expense: the testing and inspection services required by the CONTRACT DOCUMENTS.

6.4 Authority and Duties of Inspectors

6.4.1 Inspectors shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. **The INSPECTOR is not authorized to revoke, alter or waive any requirements of the CONTRACT, nor is he authorized to approve or accept any portion of the completed project**. He is authorized to call the attention of the CONTRACTOR to any failure of the work or materials to conform to the Specifications and Contract. **He shall have the authority to reject materials or suspend the work until any questions at issue can be referred to and decided by the OWNER and/or ENGINEER.** Inspectors shall perform their duties at such times and in such manner as will not unnecessarily impede progress under the contract.

6.4.2 **The Inspector shall in no case act as foremen or perform other duties for the Contractor**, nor interfere with the management of the work by the CONTRACTOR. Any advice which the INSPECTOR may give the CONTRACTOR shall not be construed as binding the DISTRICT in any way, or releasing the CONTRACTOR from fulfilling all of the terms of the CONTRACT, or complying with these regulations or other applicable laws.

6.4.3 Where there is disagreement between the CONTRACTOR (or his representative) and the INSPECTOR, such as , refusal by the Contractor to use properly approved materials; for performing work not in compliance with DRAWINGS and SPECIFICATIONS; and/or refusing to suspend work until problems at issue can be referred to and decided by the DISTRICT, the Inspector will immediately notify the DISTRICT as to the issue of disagreement and if the CONTRACTOR still refuses to make corrections, comply or suspend work, the DISTRICT will prepare and deliver in writing to the CONTRACTOR, by mail or otherwise, a written order suspending the work and explaining the reason for such shutdown. As soon as the INSPECTOR is advised of the delivery of the shutdown order, the INSPECTOR shall immediately leave the site of the work and any work performed during the INSPECTOR'S absence will not be accepted.

7. SUBSTITUTIONS

Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be *considered*.
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 CONTRACT

DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER & DISTRICT, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER and DISTRICT may approve its substitution and use by the CONTRACTOR. Any cost differential shall be paid by the CONTRACTOR. The CONTRACTOR warrants that if substitutes are approved, 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 will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

8. PATENTS

8.1 The CONTRACTOR shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the DISTRICT harmless from loss on account thereof, except that the DISTRICT shall be responsible for any such loss when particular process, design, or product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly gives such information to the ENGINEER or DISTRICT.

9. SURVEYS, PERMITS, REGULATIONS

9.1 The DEVELOPER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the DEVELOPER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

9.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance.

9.3 Permits and licenses of a temporary nature necessary for the prospection of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the DEVELOPER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS aerate variance therewith, the CONTRACTOR shall promptly notify the DISTRICT in writing, and any necessary changes shall be adjusted at no cost to the DISTRICT.

10. PROTECTION OF WORK, PROPERTY, AND PERSONS

10.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of , and will 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 the removal, relocation or replacement in the course of construction.

10.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. ***The CONTRACTOR will remedy all damage, injury or loss to any property caused directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them*** or anyone of 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 DISTRICT or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

10.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or DISTRICT, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the ENGINEER and DISTRICT prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby.

11. SUPERVISION BY CONTRACTOR

The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and communications given to the supervisor shall be as binding as if given by the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

12. CORRECTIONS OF WORK

12.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER or DISTRICT for failure to comply with the CONTRACT DOCUMENTS, *whether incorporated in the construction or not*, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without

expense to the DISTRICT and shall bear the expense of making good all WORK of the CONTRACTORS destroyed or damaged by such removal or replacement.

12.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the DISTRICT may remove such WORK and store the materials at the expense of the CONTRACTOR**.**

13. SUBSURFACE CONDITIONS

13.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the DISTRICT by WRITTEN NOTICE of:

13.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

13.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

14. PAYMENT TO CONTRACTOR

14.1 The Developer is responsible for payment to all CONTRACTORS and SUBCONTRACTORS on the PROJECT.

14.2 Upon completion and acceptance of the WORK, the DISTRICT shall issue a certificate attached to the final payment request that the WORK shall been accepted under the condition of the CONTRACT DOCUMENTS.

14.3 The CONTRACTOR and DEVELOPER will indemnify and save the DISTRICT or DISTRICT'S agents harmless from all claims growing out of the lawful demand of CONTRACTORS and SUBCONTRACTORS, laborers, workmen, mechanics, materials, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR or DEVELOPER shall, at the DISTRICT'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived.

15. CLEAN-UP

On the completion of the work, the CONTRACTOR shall, at his own expense, remove from the line and premises all surplus material and debris of every kind and description; reseed, fertilize, and straw disturbed areas; restore to the former condition all sidewalks, crosswalks, streets, pavements, fences and other public or private property which has been disturbed by reason of the construction of the work herein specified, in workman like manner.

16. INSURANCE

16.1 The CONTRACTOR shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of, or result from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR, any SUBCONTRACTOR, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

16.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

16.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;

16.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than employees;

16.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained by any person as a result of any offense directly or indirectly related to the employment of such person by the CONTRACTOR.

16.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting there from.

16.2 Certificates of Insurance acceptable to the DISTRICT shall be filed with the DISTRICT prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the DISTRICT
.
16.3 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, Liability insurance as hereinafter specified:

16.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting the CONTRACTOR from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether operations by the CONTRACTOR or by any SUBCONTRACTOR employed by the CONTRACTOR or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR employed by the CONTRACTOR. Insurance shall be written with a limit of liability of not less than $1,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by any one person in any one accident; and a limit of liability of not less than $2,000,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $1,000,000 for all property damage sustained by any one person

in any one accident; and a limit of liability of not less than $2,000,000 aggregate for any such damage sustained by two or more persons in any one accident. Madison County Utilities District shall be added as "additional insured" to the CONTRACTOR and the developer's general liability insurance policy.

16.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACT or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

16.4. The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of the CONTRACTOR'S employees at the site of the PROJECT and in case any WORK is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statue, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of its employees not otherwise protected.

16.5 The CONTRACTOR shall secure, if applicable "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the DISTRICT, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the DISTRICT. The policy shall name as the insured the CONTRACTOR, and the DISTRICT.

17. INDEMNIFICATION

17.1 The CONTRACTOR will indemnify and hold harmless the DISTRICT and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting there from; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone direct or indirectly employed by any of them or anyone for whose acts any of them may be liable.

17.2 In any and all claims against the DISTRICT or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any 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 benefits acts.

17.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the DEVELOPER'S ENGINEER, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

18. ENGINEER'S AUTHORITY

18.1 The ENGINEER shall act as the DISTRICT representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed, and shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

18.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship, and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

18.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

18.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

19. LAND AND RIGHT-OF-WAY

19.**1 Prior to issuance of NOTICE TO PROCEED, the DEVELOPER shall provide all land and right-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS,** unless otherwise mutually agreed.

19.2 The DEVELOPER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

19.3 The CONTRACTOR shall provide at its own expense and without liability to the DISTRICT any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

20. GUARANTEE

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. The DISTRICT 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 DISTRICT 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.

21. TAXES

The CONTRACTOR will pay all sales, consumer, use, and other similar taxes required by the laws of the place where the WORK is performed.

Madison County Utilities District

III. TECHNICAL SPECIFICATIONS

WATER LINE SPECIFICATIONS

1. GENERAL

1.1 The CONTRACTOR shall furnish all labor, materials and equipment to install the water lines as shown on the plans and as specified herein. The water lines may either be pressure-rated plastic pipe (PVC),) or ductile iron (DI).The DEVELOPER will obtain all rights-of-way for operations through private property. It will also secure building permits and the permits for all pipe laid in highway rights-of-way. Any charge for inspections or other fees required will be responsibility of the DEVELOPER since the amounts of these are dependent upon the operation of the CONTRACTOR.

1.1 Department of Transportation Encroachment Permit and Bond. The Kentucky Department of Transportation will require that an Encroachment Permit and Bond be submitted for all work accomplished on their right-of-way. Preparation of the Encroachment Permit and obtaining a Bond will be the responsibility of the Developer. Each water line on which work is to be performed will be a separate application and will require a separate Permit and Bond. Each Permit will have conditions attached and these conditions will vary depending on the area where work is to be performed. In areas where traffic control may pose a problem, working hours may be limited. A copy of the Encroachment Permit will be provided to the DISTRICT and CONTRACTOR. The CONTRACTOR will be responsible for knowledge of the Permit's content and conditions in order that the construction may be accomplished in accordance with the specified requirements. Should any additional bonds or requirements be imposed by the Kentucky Department of Transportation, the DEVELOPER shall also be responsible for the bonding of the additional requirements.

2. PIPE AND FITTINGS

2.1 Polyvinyl Chloride Rigid Pipe and Fittings. This specification covers rigid, pressure-rated, Polyvinyl chloride pipe and fitting, hereinafter called PVC pipe and PVC fitting, for 1/2 inch through 12-inch. Pipe shall be as manufactured by Certaintee, North American, Diamond, J.M. or approved equal.

2.1.1 PVC Pipe.

PVC pipe shall be extruded from Type 1, Grade 1, polyvinyl chloride material with a hydrostatic design stress of 2,000 psi for water at 73.4*F, designated as PVC 1120, meeting ASTM Specifications D-1784 for material and D- 2241 for pipe, latest revisions. Pipe shall also meet all applicable provisions of the Product Standards and shall bear the National Sanitation Foundation (NSF) seal of approval in compliance with NSF Standard No. 14. PVC pipe having

a maximum hydrostatic working pressure of 200 psi (SDR 21), 250 psi (SDR17), or 315 psi (SDR13.5) shall be used as shown on the Plans.
Samples of pipe and physical and chemical data sheets shall be submitted to the DISTRICT for review and determination of compliance with these specifications before pipe is delivered to job. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects.

The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures (ASTM D-1598), burst pressures (ASTM D-1599), flattening, extrusion quality (ASTM D-2152), marking and all other requirements of the Product Standard PS 22-70 shall be conformed within all respects. No pipe, 2 inches in diameter or larger, with a wall thickness less than 0.090 inches may be used.

Pipe shall be furnished in 20 feet lengths. The pipe will have a bell on one end. Male ends of pipe must be beveled on the outside. Pipe shall have a ring painted outside the male end or ends in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation.

Pipes must be delivered to job site by means, which will adequately support it, and not subject it to undo stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or sorted as close to the final point of placement as is practical. Pipe must not be exposed to direct rays of sun for an extended period of time. If pipe is not to be installed shortly after delivery to the job site, it must be stored in a shaded location and strung as needed.

2.1.2 PVC Pipe Joining

Pipe shall be joined with slip-type joints with rubber gaskets.
Pipes with bells shall have all parts of the bell, including the gasket groove, made from the same extruded piece, integral with the pipe, and shall be thickened to meet standard dimension ratios of wall thickness to outside diameter. This manufacturing procedure shall be the normal practice of the pipe manufacturer and proven by past performance of pipe in service. The gasket groove shall be constructed such that gasket rollout will not occur. Rubber gaskets shall conform to ASTM 3139.

Joint lubricant shall be of the type recommenced by the manufacturer for their pipe. Lubricant shall be water soluble, non-toxic and have no objectionable properties.

2.1.3 Fittings

Ductile iron mechanical joint type fittings with appropriate adaptors shall be used with PVC pipe. All such fittings shall be approved by the pipe manufacturer, and a complete data sent to the DISTRICT, including the manufacturer's approval, for review. Fittings shall comply with AWWA C-110 or C-153 and shall be manufactured for the size and pressure class of the line on

which they are used. Use of transition gaskets will not be allowed unless specifically approved by the pipe manufacturer. Coatings and lining shall be in accordance with 2**.3.7. F** of this section of the Specifications.

2.1.4 Service Connections

All service connections on PVC lines shall be made by means of bronze service clamps manufactured specifically for use with PVC pipe, with **Ford S70 series saddle** or approved equal. Whenever possible, corporation stops shall be installed in plastic lines before conducting hydrostatic tests. ***All taps will be a minimum of 1" .***

2.2 Municipal Polyvinyl Chloride (MPVC) Pressure Pipe.

This specification covers the requirements for AWWA approved Polyvinyl Chloride Pressure Pipe for water supply and distribution systems.

2.2.1 MPVC Pipe

MPVC pipe shall meet the requirements of AWWA C900-75, latest revision, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4" through 12" for water" and shall be furnished in cast-iron pipe equivalent outside diameters with rubber-gasketed separate couplings.
Pipe shall be as manufactured by Certainteed, North American, Diamond, J.M., or approved equal.MPVC pipe and couplings shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784. The standard code designation shall be PVC 1120. The PVC compounds shall be tested and certified as suitable for potable water products by the NSF Testing Laboratory and shall carry the NSF approval marking.

Solvent-cement couplings or joints shall not be used. PVC joints using elastomeric gaskets shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D-3139.

Pipe and couplings shall be pressure Class 100, DR 25 (Dimension Ratio), pressure Class 150, DR 18, or pressure Class 200, DR 14 as shown on the plans.

Pipe and couplings shall be marked as follows:
a. Nominal size and OD base.
b. Material code designation (PVC 1120). c. Dimension ratio number.
d. AWWA pressure class.
e. AWWA designation number (AWWA C900).
f. Manufacturers name or trademark and projection record code. g. Seal of the NSF Laboratory.

Pipe and couplings shall meet or exceed the following test requirements: Sustained Pressure
- ASTM D-1598 (1000 Hrs.)

Sustained Pressure DR	ASTM D-1598 (1000 Hrs.) Sustained Pressure
14	600 psi
18	500 psi
25	350 psi

Burst Pressure DR	ASTM D-1599 (60-70 seconds) Minimum Burst Pressure
14	985
18	755
25	535

Hydrostatic Integrity - Each standard and random length of pipe shall be proof-tested at four times its rated class pressure for a minimum of 5 seconds. Bells or couplings shall be tested with pipe.

Flattening - The pipe shall not split, crack, or break when tested by the parallel-plato method as specified by ASTM D-2241.

Extrusion quality - The pipe shall not flake or disintegrate when tested by the acetone-immersion method as specified in ASTM D-2241.
Standard length - Pipe shall be furnished in standard laying lengths of 20 ft. + 1 in.

2.2.2 MPVC Pipe Jointing**.**

Pipe shall be joined with slip-type joints with rubber gaskets. Manufacturing and installation procedures shall be as recommended by the manufacturer and as described for PVC pipe in Section 2.1.2 of this specification.

2.2.3 Fittings.

Fittings for municipal PVC shall be ductile iron only. Fittings shall be mechanical joint. Fittings shall be manufactured for the size and pressure class of the line on which they are used and shall manufactured for the size pressure class of the line on which they are used and shall comply with AWWA C-110 or C-153.

2.2.4 Service Connections.

Service connections shall be made by means of bronze service saddles manufactured specifically for use with PVC pipe. Saddles shall be **Ford S70 Series** or approved equal.

2.2.5 Underground Marking Wire.

At all locations where pipe is utilized, a detectable underground marking wire shall be secured to the top of above the pipe with duct tape. The wire used shall be No. 12 insulated copper wire. ***Extreme*** care shall be exercised in connecting and taping splices and joints to assure continuity. At each valve box the wire shall be ran up the outside of the valve box, and a notch cut in the top and 6" of wire folded down through the notch inside the valve box. When the entire project or pipeline segment is complete, including meter installation and leak repairs, the locating wire system shall be checked for continuity.

2.3 Ductile Iron Pipe.

The specifications cover ductile iron pipe (3-inch diameter and greater) to be used in water transmission systems with mechanical joints, rubber ring slip type joints or flanged joints.

2.3.1 General.

The specifications cover ductile iron pipe (3-inch diameter and greater) to be used in water transmission systems with mechanical joints, rubber ring slip type joints or flanged joints.

Ductile iron pipe shall be designed in accordance with AWWA H3 (ASA A21.50) and for pressures and conditions as stated in these specifications or called for on the plans. Ductile iron pipe shall conform to AWWA C-151 (ASA A21.51).

2.3.2 Minimum Nominal Thickness.

The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA A21.50. The class of pipe, wall thickness, and coatings required will be shown on the plans for all ductile iron pipe installation.

2.3.3 Lengths.

Pipe may be furnished in 12, 18 or 20 feet nominal laying lengths.

2.3.4 Tests**.**

Hydrostatic and acceptance tests shall be in accordance with AWWA Specification C-106 for "Cast Iron Pipe Centrifugally Cast in Metal Molds" or C-108 for sand molds. The District shall be provided with two (2) copies of each of the following tests for each project involved:

a. Talbot strip test
b. Ring and full length bursting tests. c. Chemical analysis of pipe.
d. Certification that pipe was hydrostatically tested.

Any pipe not meeting the AWWA Specifications quoted above shall be rejected in accordance with the procedure outlined in the particular specifications.

2.3.5 Markings.

The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

2.3.7 Pipe Joints for Ductile Iron Pipe.

2.3.7.1 General

Pipe joints shall be mechanical joint, rubber ring slip joint, flanged, or locked mechanical joint as shown on the plans.

2.3.7.2 Mechanical Joint

Mechanical joints are to be furnished according to AWWA Specifications C-111. All pipe joints must be furnished complete with all accessories. Mechanical joint bolts and nuts shall be of alloy cast iron or alloy steel (Corten type such as U.S. Alloy) or approved equal. Rubber gaskets shall be made of plain first grade rubber, free of imperfections and porosity. Hardness shall be 70 to 7 durometer.

2.3.7.3 Rubber Ring Slip Joint

Rubber ring slip joint shall be equal to AWWA C-111-64 or latest revision. The joints shall be of the following materials:
a. Rubber ring gasket compressed in groove in bell of pipe.
b. Beveled spigot end of pipe for initial centering into rubber gasket in bell.

2.3.7.4 Locked Mechanical Joint

Locked mechanical joints shall be equal to Clow Corporation's "Locked Mechanical Joint".

2.3.7.5 Flanged Pipe.

All ductile iron flanged pipe shall have flanges faced and drilled, 125 pound in accordance with ASA A21.10 (AWWA C-110) unless otherwise specified on the Drawings. Flanges may be cast integrally with the pipe or they may be screwed on specially designed long hub flanges, refaced across both face of flange and end of pipe. Flanged pipe shall be in accordance with ASA A21.6 (AWWA C-106) Specifications, latest revision, and be the class called for on the plans. Where plain ends of flanged and plain end pipe fit into mechanical joint bells, centrifugally cast pipe shall be used. Flanged pipe for water service shall be cement lined and bituminous coated the same as written herein for bell-joint pipe.

2.3.7.6 Special Coupling.

Flexible couplings for flanged pipe shall be a mechanical joint cast to a special flanged joint using a neoprene O-ring in place of the usual 1/16 inch rubber ring gasket. The mechanical bell and special flanged joint piece shall be of high-grade gray cast iron (ASTM A48-56, AWWA

C-100-54T) with bolt circle, bolt size and spacing according to ASA Specifications. Mechanical joint follower flange shall be of ductile iron ASTM A399 or malleable iron ASTM A47, Grade 35018 or 32510, latest revision with high strength/weight ratio design.

Bolts shall be fine-grained high tensile malleable iron with malleable iron hexagon nut. Stainless steel nuts shall be used in vaults and vet wells. Where pressures may exceed 20 pounds, anchor studs shall be included with spigots of pipes connected drilled to receive ends of studs.

2.3.8 Joining Pipe

All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Two (2) copies of such instruction shall be delivered to the District at start of construction.

2.3.9 Coatings and Lining.

All buried ductile iron pipe shall have manufacturers outside coal tar asphaltic base coating and a cement lining and bituminous seal coat on the inside. Cement mortar lining and a bituminous seal coat inside shall conform to ANSI A21.4 (AWWA C-104) latest revision.

All pipe and fittings housed and in vaults shall be lined and coated on the inside as specified herein for buried ductile iron pipe and fittings, but shall be left uncoated on the outside so that it may be painted without the use of tar stop.

2.3.10 Fittings for Ductile Iron Pipe.

Ductile iron mechanical, rubber ring slip and flanged joints shall conform to ASA Specifications A21.10 (AWWA C-110) for centrifugally cast iron water pipe. Mechanical joints shall also conform in all respects to ASA 21.11 (AWWA C-111). All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used. All fittings shall be furnished complete with all joint accessories. All ductile iron pipe fittings for water, sewer, air, gas and force main service shall be bituminous coated outside and lined on the inside same as the line on which they are installed.

2.3.11 Ductile Iron Pipes in Acidic Soils

Polyethylene encasement shall be used on all ductile pipe constructed in acidic soil and shall meet the requirements of ANSI/AWWA C105/A21.5. Care shall be taken in the installation of the polyethylene encasement and shall be installed in accordance to ANSI/AWWA C105/A21.5.

2.3.12 Water Lines Near Gas Tanks

If the water line is located within 200 feet radius of an underground storage tank (UST), special rubber gaskets shall be provided for the water main joints. These gaskets shall be manufactured

of "nitrate rubber" material or other acceptable material possessing superior resistance to deterioration from petroleum based products. This requirement will apply to gaskets supplied for mechanical joints and push-on joints.

2.4 Polyethylene Pipe.

This pipe is used primarily for stream crossings, roadway crossings, and other special applications in locations indicated on the DRAWINGS. The required pressure class shall be as shown on the DRAWINGS.

The pipe shall be PE 3408 high density, high molecular weight polyethylene pipe equal to Performance 4000 (Ductile Iron Pipe Size). The pipe shall meet or exceed the following specifications:

Property	Test Method	Unit	Nominal Value
a. Density	ASTM D1505	gm/cm³	0.955
b. Melt Index	ASTM D1 238 (Cond E)	gm/10min	0.11
c. Flexural Modulus	ASTM D790	psi	135,000
d. Tensile Strength	ASTM D638	psi	3,200
e. HDB @ 73ºF	ASTM D2837	psi	1,600
f. UV Stabilizer	ASTM D1 603	% c	2.5
g. Hardness	ASTM D2240	Shore "D"	65
h. Compressive Strength (Yield)	ASTM D695	psi	1,600
i. Tensile Strength @ Yield (Type IV Spec.)	ASTM D638 (2"/min)	psi	3,200
j. Elongation @ Yield	ASTM D638	%, minimum	8
k. Tensile Strength @ Break (Type IV Spec.)	ASTM D638	psi	5,000
l. Elongation @ Break	ASTM D638	%, minimum	750
m. Modulus of Elasticity	ASTM D638	psi	130,000
n. Linear Thermal Expansion Coefficient	ASTM D696	in/in/°F	1.2 x 10-4
o. Thermal Conductivity	ASTM D1 77	BTU-in/ft²/hrs °F	2.7
p. Brittleness Temperature	ASTM D746	°F	<-180
q. Heat Fusion Condition	-	psi @°F	75@ 400
r. Material Designation	PPI	PE 3408	
s. Material Cell Classification	ASTM D3350	345434C	

The pipe shall be joined by the butt fusion technique utilizing controlled temperatures and pressures to produce a fused, leak-free joint that has equal or greater strength than the pipe itself in both tension and hydrostatic loading. The joining system shall be equal to Phillips butt fusion joint system.

Transitions to the continuing pipeline shall be made with the appropriate fittings to maintain the integrity of the piping system as recommended by the pipeline manufacturer.

Drawings showing details of the installation shall be submitted to the DISTRICT for approval prior to installation.

2.5 Hauling and Storage.

The CONTRACTOR shall notify the DISTRICT when pipe will be received on the job so that proper arrangements may be made for inspecting the unloading and stringing, as well as inspecting and examining the pipe materials.

The CONTRACTOR will be required to deliver all equipment and other materials and place same as and where required for installation. Care must be exercised in the handling of all materials and equipment and the CONTRACTOR will be held responsible for all breakage or damage to same caused by his workman, agents, or appliances for handling or moving. Pipes and other casting shall in no case thrown or dropped from cars, trucks, or wagons to the ground, but some shall be lowered gently and not allowed to roll against or strike other castings and unyielding objects violently.

Pipes and other casting may be distributed at places that will not interfere with other construction operations and unloaded, or yarded and distributed as required, as the CONTRACTOR may elect. Valves, castings, fabricated metal, reinforcing steel, etc. shall be yarded or housed in some convenient location by the CONTRACTOR and delivered on the ground as required. All equipment and materials subject to damage from the weather, dampness, changes in temperature, or exposure shall be protected by a dry, weatherproof enclosure until ready for installation or use. The cost of all hauling, handling, and storage shall be included in the prices bid for equipment and materials in place. The DISTRICT takes no risk or responsibility for fire, flood, theft, or damage until after the final acceptance of the work.

3. LINES AND GRADE

The CONTRACTOR will be required to accomplish any detailed layout, including that required for establishing the grade of the pipeline.

4. TRENCH EXCAVATION

4.1 General.

This section describes the acceptable methods of trenching for the installation of pressure pipe and casing pipe in an open trench.

Trenching may be accomplished by means of a trackhoe, backhoe, trenching machine or by hand depending on the construction area. At the CONTRACTOR'S option, trenching, by a trenching machine, trackhoe or by backhoe is acceptable except where the pipeline is being constructed close to other utilities, structures, building, or large trees, and when it is reasonable to anticipate possible damage from the use of a trackhoe, backhoe, then trenching shall be made by hand methods.

The PROJECT includes all trenching necessary for installation of all pipelines as planned and specified. Trenching also includes such items as minor street, road, sidewalk, pipe and small

creek crossings; cutting, moving or repairing damage to fences, poles, or gates and other surface structures regardless of whether shown on the plans.

The CONTRACTOR shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of this backfill. In case of damage to any existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structures will be in as good condition and serve its purpose as completely as before and such restoration and repair shall be done without extra cost to the DISTRICT.

The use of trench-digging machinery will be permitted except where its operations will cause damage to trees, buildings or existing structures above or below the ground. At such locations hand methods shall be employed to avoid such damage. All excavated materials shall be piled in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

All excavation shall be open trenches, except where the drawings call for tunneling, boring, or jacking under structures, railroads, sidewalks and roads. The construction procedure for these types of excavation is described elsewhere in these specifications.

All trench excavation shall be termed unclassified.

4.2 Clearing.

The CONTRACTOR shall accomplish all clearing and/or grubbing as required for the construction under this contract. Clearing and grubbing shall include the cutting and removal of trees, stumps, brush, roots, logs, fences and other loose or projecting material and natural obstructions and shall include removal of all weeds and briars which, in the opinion of the ENGINEER, must be removed to properly prosecute the completion of construction and operate the facilities upon completion of construction. Trees, unless designated otherwise on the plans, shall remain and be properly protected. Ornamental shrubs, planting, fences, walls, etc. shall be removed and replanted or replaced or protected from the construction activity. Clearing and/or grubbing shall be incidental to the various bid items and no additional compensation will be paid for same.
The CONTRACTOR shall dispose of any such material by burning, burial, or hauling away (or as noted on the drawings), at no extra cost to the OWNER. It shall be the CONTRACTOR'S responsibility to notify the appropriate State and local Air Pollution Control agencies when he conducts open burning of refuse.

4.3 Trench Depth.

Trenches shall be excavated to the line and grade required for the installation of pipe at the elevations indicated on the plans. The minimum depth of cover shall be **36 inches above the top of the pipe**, unless shown otherwise on the plans or on the Standard Details. In all cases, the pipe shall be installed a minimum of 36" below the elevation of the finished roadway

immediately adjacent to the pipe. When the pipe is laying in or on solid rock, the minimum depth of cover shall also be 36 inches above the top of the pipe. Excavation, except as required for exploration, shall not begin until the proposed work has been staked out. Materials which are not required for backfill and site grading shall be removed and disposed of as directed by the DISTRICT. Excavation shall be of sufficient depth to allow the piping to be laid on the standard pipe bedding in accordance with the Section 5 of this section. The trenches shall be excavated to ***a minimum of six (6) inches below the bottom of the pipe barrel in rock***. In all cases where lines are under traffic a minimum cover of thirty-six (36") inches shall be provided. Water lines in state roar right-of-way shall have a minimum cover over the top of the pipe of forty two (42) inches. Should it be necessary to avoid existing utilities, culverts, outlets, or other structures, the water line shall be carried deeper at no additional expense.

4.4 Trench Width.

Trench widths shall exceed the minimum width that will provide free working space on each side of the pipe and to permit proper backfilling around the pipe as shown in the accompanying table and unless specifically authorized by the DISTRICT, shall not be excavated to wider than two (2) feet plus the nominal diameter of the pipe at the top of the trench. Before laying the pipe, the trench shall be opened far enough ahead to reveal any obstruction that may necessitate changing the line and grade of the pipe. Should the CONTRACTOR fail to accomplish this, and changes are required, they shall be at his sole expense. In rock, all ledge rocks, boulders, and large stones shall be removed to provide six (6) inches of clearance on each side and below all pipe and fittings.

MINIMUM TRENCH WIDTH

Size	Width	Size	Width
Up to 4" Pipe	2'-0"	15" Pipe	2'-8"
6" Pipe	2'-0"	16" Pipe	2'-8"
8" Pipe	2'-0"	18" Pipe	3'-0"
10" Pipe	2'-6"	20" Pipe	3'-2"
12" Pipe	2'-6"	21" Pipe	3'-4"
14" Pipe	2'-6"	24" Pipe	3'-8"

4.5 Shoring, Sheeting, and Bracing of Excavation.

Where unstable material is encountered, or when the depth of the excavation in earth exceeds five (5) feet, the sides of the trench or excavation shall be supported by substantial sheeting, bracing or shoring. The design and installation of all sheeting, sheet piling, bracing or shoring shall be based on computations of pressure exerted by the materials to be retained under retaining conditions. Adequate and proper shoring of all excavations will be the ***entire responsibility*** of the CONTRACTOR. The Standards of the Federal Occupational Safety and Health Act and the Kentucky Department of Labor shall be followed. The DISTRICT ***will not be responsible*** for determining requirements for bracing or sheeting.

4.6 Removal of Water.

The CONTRACTOR shall provide for adequate removal of all water and the prevention of surface water from entering the excavation. The CONTRACTOR shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure. All water pumped or drained from the excavation shall be disposed of in a suitable manner without damage to adjacent property or to other work under construction.

4.7 Pavement Removal.

Pavement removal shall be as indicated on the plans or directed by the DISTRICT. When so required, or when directed by the DISTRICT, only one-half (1/2) of the street crossing or road crossing shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such a manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property OWNERS abutting the improvements shall be taken into consideration.

All public or private drives shall be promptly backfilled or bridged at the direction of the DISTRICT. Pavement replaced shall be in accordance with Drawings of these specifications. Excavated materials shall be disposed of so as to cause the least interference and in every case the disposition of excavated materials shall be satisfactory to the DISTRICT.

4.8 Traffic Maintenance.

The CONTRACTOR must "red light" and guard all open trenches or obstructions placed on the streets or sidewalks. The lights must be burning from sunset to sunrise in order to effectually warn and safeguard the public against dangers connected with open trenches, excavations and other obstructions. *The CONTRACTOR shall be held responsible for any damage that may occur to persons or property by reason of the failure of the CONTRACTOR to properly "red light" and guard all open trenches or obstructions along the routes of the water lines.* This CONTRACTOR at his own expense shall also maintain warning signs, barricades and a watchman or flagman to control traffic at such times, as his work would interfere with the flow of traffic. No excavation shall begin that may present a safety hazard unless the signs, barricades, lights, etc. are available to protect the open excavation at the conclusion of the day. The CONTRACTOR will comply with all Federal and State Occupational Safety and Health requirements for this type of construction. The CONTRACTOR shall also comply with all local and Kentucky Department of Highways requirements for signing and traffic control.

4.9 Line Location.

The location of pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. In such cases, the DISTRICT reserves

the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. ***The DISTRICT is under no obligation to locate pipelines*** so they can be excavated by machine.

5. BEDDING OF PIPELINE.

5.1 General

In all cases the foundation for pipe shall be prepared so that the entire load of the backfill on top of the pipe be carried uniformly on the barrel of the pipe. The bells of the pipe shall not carry any of the load of backfill. The CONTRACTOR should refer to the Standard Details for pipe bedding shown in the plans. The bedding specifications shall govern the backfill from the bottom of the trench up to the centerline or spring line of the pipe.

5.2 Stable Earth Foundation.

On all PVC pipelines, the trench bottoms shall be smooth and free of frozen material, clotted dirt and stones over 1/2" diameter. Bottom dirt left by trenching equipment will usually provide adequate material to level the trench bottom and provide bedding support for the pipe barrel. If the trench bottom is free of dirt, soft material may be shoveled off the sidewalls or shoveled under the pipe to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill must be provided to insure the pipe barrel is properly cushioned. See the plans for proper bedding material depth. If the foundation is good firm earth the pipe may be laid directly on the undisturbed earth provided the pipe barrel is supported for its full length.
Bedding on No. 9 stone, fine gravel, sand or compacted finely graded select earth shall be used to correct irregularities in the sub-grade. Where bell and spigot is involved, bell holes shall be excavated to prevent the bells from being supported on undisturbed earth.
As an alternative to the above method, excavation in earth may be undercut to a depth below the required invert elevation that will permit laying the pipe on a bed of granular material or finely graded select earth to provide continuous support for the pipe barrel. Bedding depth shall be as shown on the plans.

All ductile iron pipe shall be installed in accordance with Standard ANSI/AWWA C150/A21.50Laying Condition Type 3 unless otherwise noted.

The bedding is not a separate pay item and shall be included as incidental expense.

5.3 Trenches in Rock.

All installation in rock will utilize the undercutting method. Bedding will be with 6 inches crushed stone as shown in the Standard Details.

5.4 Unstable Trenches.

If unstable material is encountered which may not provide suitable foundation for the pipe, the unstable material will be removed and an adequate layer of encasement concrete or other special bedding shall be placed for the pipe foundation in accordance with the Standard Details in the plans. Such "special pipe foundation" shall only be installed if directed by the DISTRICT in writing or on the plans.

6. PIPE LAYING.

6.1 General.

Proper instruments, tools and facilities satisfactory to the ENGINEER shall be provided and used by the CONTRACTOR for the safe and convenient prosecution of the work.

Each pipe manufacturer shall have an experienced representative on the job for at least one day at the commencement of jointing and laying operations. Before any length of pipe is placed in the trench, a careful inspection shall be made of the interior of the pipe to see that no foreign material is in the pipe. In order to properly remove any foreign materials, a swab of necessary length is to be available at all times.

All pipe shall be lowered carefully into the trench, properly aligned and properly joined by the use of suitable tools and equipment, in such a manner as to prevent damage to water line materials and protective coatings and linings. Excessive scratching of the exterior surface of the pipe will be cause for rejection of the pipe.

Under no circumstances shall pipeline materials be dropped or dumped into the trench. The pipe and fittings shall also be inspected for the purpose of determining if they are sound and free from cracks. Laying of pipe shall be commenced immediately after excavation is started. Pipe shall be laid with bell ends facing in the direction of laying.

When pipe laying is not in progress, the open ends of pipe shall be closed by approved means to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the ENGINEER. No pipe shall be laid in water or on frozen trench bottom, or whenever the trench conditions or weather are unsuitable for such work.

If any defective pipe and fittings shall be discovered after the pipeline is laid, they shall be removed and replaced with a satisfactory pipe or fitting without additional charge to the OWNER. ***Open ends of unfinished pipe lines shall be securely plugged or closed at the end of each day's work or when the line is left temporarily unattended .***

6.2 Laying Ductile Iron Pipe.

Ductile iron bolted joint and rubber ring slip joint pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the manufacturer. Three (3) copies of instructions shall be furnished by the ENGINEER and one (1) copy shall be available at all times at the site of the work. The lining inside ductile iron pipe must not be damaged by handling.

All pipes must be forced and held together, or "homed" at the joints, before sealing or bolting. Pipes must be aligned as each joint is placed, so as to present as nearly true, straight lines and grades as is practical, and all curves and changes in grades must be laid in such a manner that the manufacturer's recommended maximum deflection is not exceeded at any joint.

Cutting of pipe may be done by wheeled pipe cutters or saws, or by hammer and chisel, as the CONTRACTOR may elect, but the CONTRACTOR will be held responsible for breakage or damage caused by careless cutting or handling. All ductile iron pipe shall be installed in accordance with Standard ANSI/AWWA C150/A21.50 Laying Conditions Type 3 unless otherwise noted.

Six (6) inches crushed stone bedding shall be used in rock. Sufficient space (limited to 2 feet longitudinally) shall be left out of 4 or 6-inch cushion for tightening of bolts where bolted joints are used. ***No pipe shall be laid resting on rock, blocking, or other unyielding objects.***

Jointing before placing in trench, and subsequent lowering of more than one section jointed together may be allowed, subject to the ENGINEER'S approval and direction.

When using pipe with push-on joints care must be exercised to make certain that the correct gasket is being used for the type of joint installed and that the gasket faces the proper direction. Before inserting the gasket, the groove and bell socket should be carefully cleaned of all dirt. If sand or dirt is permitted to remain in the groove, leaks may occur. Lubricant must be applied to bell socket, gasket and plain-end of pipe as required by manufacturer. Plain-end must be beveled before joint is made. Deflection required at the joint shall be obtained after the joint is made.

Cut pieces of ductile iron pipe 18 inches or more in length, shall be used in fitting to special conditions, and valves and fittings changes in grade and alignment, provided cutting is even enough to make first class joints and no cracks are evident.

6.3 Laying PVC Pipe.

The trench bottom must be smooth and uniform and the alignment must conform to the plans. Bedding and cover as specified herein and shown in the Standard Details is required.

To make a clean and unobstructed joint, it is necessary to wipe the ring, groove and pipe spigot free from all foreign materials at the time of assembly (welded joints will be allowed only in

special cases and will be required as shown on the plans). The ring must be positioned properly in the fitting to receive the pipe by a worker who is not in contact with the lubricant. In general, the lubricant is applied to the spigot, (not the ring or groove). However, the manufacturer's instructions are to be followed in all cases. Only approved lubricant may be used in accordance with the manufacturer's recommendations. ***All plastic pipe shall be joined by hand.***

Where good bedding conditions are attained PVC pipe smaller than 4 inches may be assembled outside the trench in longer sections (as conditions allow) and then lowered into the trench. At any time when improper bedding is discovered or the pipe is severely deflected the pipe will be removed from the trench and the condition corrected. Pipe in sizes 4 inch and above may be assembled outside the trench but must be lowered in to the trench as each joint is assembled. Regardless of installation methods all couplings must be inspected after laying in trench for proper insertion and alignment. Field cuts and bevels will be allowed in accordance with the manufacturer's recommendations for these operations. A new reference mark shall be installed before joining any field cut pipe. The same requirements for clearance from rock or other objects, thrust blocking and deflections shall apply to PVC pipe as for other pipe materials.

Municipal PVC pipe of all sizes must be assembled in the trench in strict accordance with the manufacturer's requirements.

7. BACKFILLING.

Backfilling must be started as soon as practicable after pipe has been laid and joints hardened sufficiently, and jointing and alignment approved. Spading of crushed rock, sand, or mechanical tamping of earth, around pipe (as specifically required) between joints shall be the usual procedure as the laying progresses.This is in order to avoid danger or misalignment from slides, flooding or other causes. The ENGINEER shall be given a minimum of 24 hours for inspection before inspection before backfilling.

The backfill shall be crushed rock, sand, or finely divided earth free from **debris, organic material, and stones**, places simultaneously on both sides of pipe to the same level.

In backfilling of the lower part of the trench beginning at the top of the bedding, the backfill material shall be carefully and solidly tamped in 6" layers around the pipe and up to a point 8 inches higher that the top of the pipe. For PVC only the backfill shall be select material and be walked-in. Walking or working on the completed pipe line, except as necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point one diameter higher than the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipe line will not be disturbed and injurious side pressures do not occur.

After the above specified backfill is placed, rock may be used in the backfill in pieces no larger than 18 inches in any dimension and to an extent not greater than one-half (1/2) the backfill materials used. If additional earth is required, it must be obtained and placed by the

CONTRACTOR. Filling with rock and earth shall proceed simultaneously, in order that all voids between rocks may be filled with earth. Above the hand placed backfill, machine backfilling may be employed without tamping, (if not contrary to specified conditions for the location) provided caution is used in quantity per dump and uniformity of level of backfilling. Backfill material must be uniformly ridged over trench and excess hauled away, with no excavated rock over 1-½ inch in diameter or pockets of crushed rock or gravel in top 6 inches of backfill. Ridged backfill shall be confined to the width of the trench and not allowed to overlap onto firm original earth and its height shall not be in excess of needs for replacement of settlement of backfill.

All rock, including crushed rock or gravel from construction, must be removed from yards and fields. Streets, roadways and walks shall be swept to remove all earth and loose rock immediately following backfilling. In case of street, highway, railroad, sidewalk and driveway crossings or within any roadway paving or about manholes, valve and meter boxes, the backfill must be machine tamped in not over 4-inch layers, measured loose in accordance with the standard details. Where backfill is under paved driveways, streets, highways, railroads, sidewalks, paved parking areas and other areas where settlement is not allowed, crushed stone or coarse sand backfill only shall be used up to the paving surface. Crushed stone shall be Kentucky Department of Highways Standard Specification No. 78 or finer. Coarse sand backfill shall be spread in layers not over 4 inches thick and thoroughly compacted. Sand may be moistened to aide compaction. Tunnels shall be backfilled in not over 3-inch layers, measured loose, with selected material suitable for mechanically tamping. If material suitable for tamping cannot be obtained, sand gravel or crushed rock (No. 78) shall be blown, packed or sluiced to complete fill all void spaces.

Where local conditions permit, pavement shall not be placed until 30 days have passed since placing backfill. Crushed stone is specified for roads and parking areas and sidewalks or their bases, shall be placed and compacted to the top of trench. Backfills shall be maintained easily passable to traffic at original gravel, until acceptance of project or replacement of paving or sidewalks.

Where the final surfacing is to be crushed stone, compacted earth backfill may be used in the trench within 6 inches of the top as shown in the Standard Details.

Railroad Company and Highway Department requirements in regard to backfilling will take precedence over the above general specification where they are involved.

Excavated materials from trenches and tunnels in excess of quantity required for trench backfill shall be disposed as shown on the plans or as directed by the ENGINEER.

The CONTRACTOR shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits, power and telephone poles and guy wires from danger of damage while pipelines are being constructed and backfilled, or from danger due to settlement of his backfill.

In case of damage to such any existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structure will be in as good condition and serve its purpose as completely as before under covering and such restoration and repair shall be done without extra charge.

No extra charge shall be made for backfilling of any kind, except as a part of the unit price bid for which it is subsidiary. No extra charge shall be made for supplying outside materials for backfill.

Before completion of contract, all backfills shall be reshaped, holes filled and surplus material hauled away, and all permanent walks, streets, driveway and highway paving, and sod, replaced and reseeding performed.

The line CONTRACTOR shall be responsible for clean-up, grading, seeding, sodding or otherwise restoring all areas that he disturbs within the work limits of other CONTRACTORS on this project.

Any deficiency in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, shall be supplied by the CONTRACTOR.

8. TIE-INS TO EXISTING PIPELINES.

This work shall consist of connecting new water pipes to the existing system where shown on the plans and shall include the necessary fittings, tapping sleeves, valves and necessary equipment and material required to complete the connection.

Knowledge of pipe sizes in the existing system may not be accurate, therefore, it is recommended that the CONTRACTOR check outside diameters of existing pipe and types of pipe prior to ordering the required accessories. No additional payment will be allowed for matching pipe and /or accessories when the proper size is not ordered.

Neither the OWNER nor the ENGINEER can guarantee the location of the existing lines. The *CONTRACTOR shall verify the location of all existing water mains and valves pertaining to the proposed improvements before excavation is started.*

The necessary regulation operation of the valves on existing water mains, to allow for the connections being made, shall be supervised by the DISTRICT. Before shutting down an existing water main or branch main for a proposed connection, prior approval for a specific time and time interval shall be obtained for a representative of the OWNER. *At no time shall an existing main be shut down without the OWNER'S knowledge and permission* ***(48 HOUR NOTICE REQUIRED).***

Excavation at existing water mains shall be carefully made, with care being exercised not to damage the pipe. The excavation shall not be of excessive size or depth beneath the pipe. The sides of the excavation shall be as nearly vertical as possible.

The CONTRACTOR shall be responsible for any damage to the existing system and any such damage shall be repaired to the satisfaction of the DISTRICT and ENGINEER at the CONTRACTOR'S expense.

The CONTRACTOR shall verify, by field inspection, the necessary sizes, lengths and the type of fittings needed for each inter-connection. Typical connections are shown on the plans and any modifications or changes shall be subject to proposed water main needed for this work shall also be determined by field measurement as required.

The probing required to locate existing mains is not a separate pay item.

9. PIPE ENTERING STRUCTURES.

Ductile iron, steel or PVC pressure pipe, 4-inch diameter or larger, entering structure below original earth level, unsupported by original earth for a distance of more than six (6') feet, shall be supported by Class B concrete, where depth of such support does not exceed three (3') feet, and by Class B Concrete piers where depth exceeds three (3') feet in accordance with the Standard Details. All other pressure pipe entering building or basins below original earth level, which have more than 3 feet span between wall and original earth and having a cover of more than 24 inches of earth, or under roadway, shall be supported as shown on Standard Detail drawings, in order to prevent breakage from settlement of backfill about the structure. Concrete and reinforcing steel for such supports are to be included in the unit price of work to which it is subsidiary, and not as extra concrete, in order to discourage excessive excavation outside the limits of structures. Pipe entering structures shall have flexible joint within 16 inches of exterior of structure.

10. OWNERSHIP OF OLD MATERIALS.

10.1 Pipe

Unless otherwise indicated, all existing pipe that is to be abandoned that interferes with construction or is easily removed shall become the property of the CONTRACTOR. All pipe that is not easily removed or not required to be removed as a result of the new construction, shall be abandoned in place by this CONTRACTOR.

10.2 Pipe Line Fittings and Appurtenances

All pipe line fittings, valves, hydrants and other like appurtenances that are removed as a result of new construction shall be removed by this CONTRACTOR but shall become the property of the OWNER. All such fittings an appurtenances shall be delivered to a point by the

CONTRACTOR. Said point shall be on the OWNER'S property and shall be designated by the ENGINEER.

10.3 Other Materials

All other materials or items that are to be removed, demolished, or abandoned as a part of this contract shall become the property of the CONTRACTOR and shall be disposed by him.

11. THRUST BLOCKS AND ANCHORAGE.

Thrust blocks shall be installed whenever the pipe line changes direction, as at tees, bends, crosses, stops, as at a dead end; or at valves. The locations of thrust blocks depend on the direction of thrust and type of fitting. Their size and type depends on pressure, pipe size, kind of soil, and the type of fitting. Where thrusts act upward (as at vertical curves) the weight of the pipe, the water in the pipe and the weight of the soil over the pipe should be determined to make certain that the total weight is sufficient to resist upward movement. If there is not enough soil or if it will not compact over the pipe or it is too soft and mushy to resist movement, then ballast or concrete may be placed around the pipe in sufficient weight and volume to counteract the thrust. Where a fitting is used to make a vertical bend, the fitting may be anchored to a concrete thrust block designed to key in to undisturbed soil and to have enough weight to resist upward and outward thrust, since the new placed backfill may not have sufficient holding power.

Thrust blocks shall be constructed of not less than Class B concrete conforming to KBH Specification 601 and placed between the fitting and the trench wall. It is important to place the concrete so it extends to undisturbed (freshly cut) trench wall.

12. MAINTENANCE OF FLOW OF DRAINS AND SEWERS.

Adequate provision shall be made for the flow of sewers, drains and water courses encountered during construction. Any structures which are disturbed shall be satisfactorily restored by the CONTRACTOR.

13. INTERRUPTION OF UTILITY SERVICES.

No valve, switch or other control on any existing utility system shall be operated for any purpose by the CONTRACTOR without approval of the Engineer and the Utility. All consumers affected by such operations shall be notified by the CONTRACTOR as directed by the Engineer and Utility before the operation and advised of the probable time when service will be restored.

14. FENCING.

Where water supply line is being constructed in fields where stock is being grazed, CONTRACTOR shall provide temporary fence as approved by the ENGINEER around open trenches to prevent stock from falling in trenches. Where trenching operations should isolate grazing stock from their source of water, CONTRACTOR will either provide temporary bridging over trench or else provide water for such stock.

Where trench crosses near sound existing corner posts and existing fence is in good condition, fence may be taken loose, rolled back and stored until pipeline is completed at this point, then replaced by stretching tightly and thoroughly stapling. Additional posts will be provided and additional new fence shall be provided when it is necessary to place the fence crossed by the water line in a condition equal to existing fence before waterline was constructed.

Where it is necessary to cut existing fence, new end posts shall be installed on each side for the water line and the old fence thoroughly stapled to these new posts before cutting. After pipe line is completed at this point, a new fence of galvanized wire (no. 9 gauge with No. 11 filler wires) shall be stretched between these new end posts and thoroughly stapled to existing posts and any new intermediate posts necessary to provide a good fence. Replacement of fences shall be on a replacement in-kind basis, and shall be considered incidental to laying of the lines and any additional cost shall be included in the unit price bid per lineal foot of pipe.

15. PROTECTION OF ADJACENT LANDSCAPE.

Reasonable care shall be taken during construction of water lines to avoid damage to vegetation. Ornamental shrubbery and tree branched shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line to avoid trees and to keep from damaging their roots. The CONTRACTOR shall be fully responsible for setting all claims by private property owners concerning damage to trees and shrubs.

16. COORDINATION WITH UTILITIES.

The Plans show the general location of existing utilities, such information having been determined from the utilities. ***However, such information shall be considered general and is not guaranteed by OWNER or ENGINEER.***

Prior to construction, the CONTRACTOR shall arrange to meet with representatives of all utilities, and provide them with his anticipated work schedule. The CONTRACTOR shall have the utilities make their best determination of utility locations in the areas in which he is working. Throughout the progress of the work, such field marking of utilities shall be kept current. Repairs to any utilities damaged by the CONTRACTOR shall normally be performed by the

utility at the CONTRACTOR'S expense, unless the CONTRACTOR and the utility negotiate other understandings and/or procedures.

17. BLASTING AND ROCK EXCAVATION.

The CONTRACTOR shall make his own investigation as he deems necessary to ascertain the sub-surface conditions to be encountered in the work.

All blasting operations shall be conducted in accordance with municipal ordinances, state and federal laws and Section 9, Explosives, of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc. Soil particle velocity shall not exceed limit set by Kentucky law. All explosives shall be stored in conformity with said ordinances, laws and safety regulations. No blasting shall be done within five feet of any water mains, sewer lines, natural or manufactured gas lines, liquid petroleum product lines or other utilities. Any damage done by blasting is the responsibility of the CONTRACTOR and shall be promptly and satisfactorily repaired by him.

The CONTRACTOR shall use delay caps or other approved methods to reduce earth vibrations and noise. Mud capping, as defined in the above manual, will not be permitted on Sundays or after dark.

Prior to commencing with the work, the CONTRACTOR shall, during preconstruction conference with the OWNER and ENGINEER, state clearly his approach to performing the excavations on the project. He shall be familiar with the laws and ordinances covering blasting and shall also give consideration to the use of hydraulically operated rock breaking devices in lieu of blasting where considered necessary. If blasting is not handled in an expert manner at all times, the ENGINEER reserves the right to suspend blasting and require the work to proceed without it.

Prior to blasting, the CONTRACTOR shall make his own detailed survey of adjacent walks, curbs, retaining walls, house foundations, etc. to determine conditions prior to the work. Such a file of information, including photographs, may be certified in such a manner as the CONTRACTOR believes necessary since this information that may stand in his defense.

All blasting operations shall be in compliance with all Local, State and Federal Laws and Regulations..

18. GATE VALVES (4" AND LARGER)

18.1 General

All underground gate valves shall be the resilient seat-type, iron body, non-rising steam, fully bronze mounted, tar-coated outside and suitable for working water pressures of not less than 200 PSIG. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA Specification C-509. Valves

shall be furnished with flanged (exposed piping) or mechanical joint (buried piping) end connections suitable for connection to the pipe with which they are to be used. Gate valves shall have a clear water way equal to the nominal diameter, and shall be opened by turning to the left. The operating nut or wheel shall have an arrow cast in the middle, indicating the direction of opening. Each valve shall have the maker's initials, pressure rating and the year in which manufactured, cast on the body. Prior to shipment from the factory each valve shall be tested by hydraulic pressure of at least 300 pounds per square inch.

Underground valves shall be nut operated, unless otherwise shown on the plans. Valve supplier shall furnish two standard stem iron wrenches for turning nut-operated valves. ***All underground valves which have nuts deeper than 30 inches below the top of valve box shall have extended stems with nuts located within 2 feet of valve box cap.***

The valve maker is to supply the ENGINEER and/or DISTRICT, through the CONTRACTOR, complete catalogs or other material giving complete details and dimensions of valves and accessories. The ENGINEER'S and/or DISTRICT'S approval shall be received by manufacturer prior to shipment of materials.

18.1 Operators

The valve operating mechanisms shall before counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a 2-inch square-operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be not less than twice the nominal valve diameter. An extension stem shall be furnished if required to bring the operating nut within 3 ½ feet of finished grade. Extension stems shall be securely fastened to the valve stem. A stainless steel collar, 6-inches high, shall be welded to the operating gear box housing centered on the operating nut to hold the valve box in place and seal it against dirt. The diameter of the collar shall be such that it will accept the valve box. The valves shall be manufactured by Kennedy or approve equal.

19. AIR VALVES

19.1 Air Relief Valves

A valve designed to allow exhaust of small pockets of air from the water main while in use shall be installed where shown on the plans or where directed by the ENGINEER / OWNER.

The air release valve shall have an iron pipe thread inlet in sizes shown in the valve schedule, cast iron body construction, and bronze trim, with all internal parts of stainless steel or bronze. The valve shall have an orifice size shown in the valve schedule. Valves shall be suitable for a working water pressure of 150 PSIG. The air release valve shall be mounted on 3/4", copper riser pipe. The riser pipe shall be connected to the water main by use of a saddle and a corporation stop as shown in the standard details. The riser shall also have a 3/4", ball valve,

suitable for a 150PSIG working water pressure. Equipment shall be as manufactured by Mueller, Ford, Crane, Val-Matic or approved equal.

Air release valves will be installed in the same type of box as is used for meters. The box shall be Ford / Mueller or equal. The box must allow for adequate cover over the pipe at the installation.

AIR RELEASE VALVE SCHEDULE

Location	Inlet Size	Orifice Size	Model
1. As shown on drawing	3/4"		V15A2
2. As shown on drawing	1”		V15A3

19. Combination Air Valves (CAV)

Combination air release valves (single body, double orifice) shall be designed to allow large volumes of air to escape out the large air vacuum orifice when filling a pipeline and to close water tight when the liquid enters the valve. During large orifice closure, the small air release orifice shall open to allow small pockets of air to escape automatically and independently of the large orifice. The large air vacuum orifice shall also allow large volumes of air to enter through the orifice during pipeline drainage to break the vacuum. The body inlet must be baffled to protect the lower float from direct contact of the rushing air and water to prevent premature valve shut off. The top float must be protected in similar manner for the same purpose. The Buna-N seat must be fastened to the valve cover without distortion for drop tight shut off. All floats shall be heavy stainless steel, hermetically sealed; designed to withstand 1000 psi or more. The upper float shall be center guided for positive shut off. Valve exterior to be painted red lead TT86B Type IV for high resistance to corrosion. Materials certified to ASTM specifications as follows:

Body & Cover & Baffle - Cast Iron
Stainless Steel Float
Buna-N Seat & Needle
Plug & Bronze Foring
Delrin Level Frame

ASTM A48 Class 30
ASTM A240
Nitrile Rubber ASTM SB 800
ASTM D638

Combination air release valves shall be as shown in the valve schedule manufactured by APCO or equal. The valve shall be built for 300 psi service.

19.3 Custom Combination Air Valves (CCAV)

Custom combination air valves (double body, double orifice) allow large volumes of air to escape out the large orifice when filling a pipeline, then close when liquid enters the valve. The small orifice Air Release Valve shall be an independent valve body, side connected to the large orifice Air and Vacuum Valve body with piping, and a 1" brass gate valve for isolation. While the large orifice is closed, the small air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice. The small orifice air release valve shall be an independently operated compound lever mechanism of cast stainless steel or bronze.

The large air and vacuum orifice shall also open and allow large volumes of air to enter the pipeline during pipeline drainage to break the vacuum. The large orifice float must be surrounded by a baffle for protection against direct forces of rushing air and water to prevent premature valve shutoff. The baffle must be a heavy integral cast part of the main valve body, not a loose piece.

The Buna-N seat shall be compression molded, a minimum 1/2" thick and fastened to the valve cover with shoulder screws to lock the seat in place without distortion, for drop tight shutoff. Both floats shall be heavy stainless steel, hermetically sealed. The large orifice float shall have a one piece rod to center guide it through stainless steel bushings into shut-off against seat.

The custom combination air valve shall be rated 300 psi. The small orifice shall operate (open) up to 150 psi.

All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

Body & Cover	Cast Iron	ASTM A48, Class 30
Floats	Stainless Steel	ASTM A240
Needle & seat	Buna-N	ASTM A296 T316
Leverage Mechanism	Stainless Steel	FDA Approved for
Exterior paint	Phenolic Primer	Potable Water
	Red Oxide	Contact

Valve to be APCO Series 1800 custom combination air valve, as manufactured by Valve and Primer Corporation, or equal.

20. FIRE HYDRANTS

20.1 General.

The CONTRACTOR shall provide all labor, tools, equipment and materials to furnish and install fire hydrants with gate valves as shown on the drawing and as directed by the ENGINEER.

Hydrants shall be designed for 150 pounds working pressure or 300 pounds hydrostatic pressure and shall conform to the latest specifications of the AWWA. All working parts shall be bronze. The hose outlets and steamer nozzle shall be of such size and design that it will fit the present firefighting equipment. Hydrants shall be designed so that no water will be lost when they are broken off and so they can be repaired with a repair kit. Design materials, and workmanship shall be similar and equal to the materials, and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Length of barrel shall be such to provide ample cover over the connecting line. *Working drawings and full description of hydrants shall be submitted to the DISTRICT before ordering.* All hydrants shall have a 5 1/4 inch valve opening against pressure. ***The hydrants shall be equal to those manufactured by Kennedy.*** Four spanner wrenches for operation of the hydrants shall be furnished for the DISTRICT'S use.

20.2 Paint.

Hydrants shall be painted one coat of primer and two finish coats of approved paint of color directed by the DISTRICT (**Red**). Painting shall conform to AWWA C902-85, Section 4.2 Painting.

20.3 Installation.

Hydrants shall be set at such elevations that the connecting pipe will have the same depth of cover as the distribution main. The hydrant shall be set upon a slab concrete not less than four inches thick and 15 inches square. The back of the hydrant opposite the pipe connection shall be firmly wedged against one and one-half square feet or enough of the vertical face of the trench with concrete to prevent the hydrants from blowing off the line. If the character of the soil is such, ***in the opinion of the DISTRICT all hydrants will be connected to the valve with MJSHAU1 (6" X 18" SWIVEL ADPT) and valve to tee with I6FABC (6" FOSTER ADPT).***

Not less than seven cubic feet of No. 9 stone shall be placed around the base of the hydrant to insure drainage. Before the No. 9 stone is placed and before it is backfilled the drain holes shall be inspected and thoroughly cleaned if necessary. The backfill around the hydrant shall be thoroughly compacted to the grade line in a manner satisfactory to the DISTRICT. Hydrants shall have the interior cleaned of all foreign matter before installation.

All hydrants will be installed with the pumper connection facing the main access road or as directed by the DISTRICT.

Stuffing boxes shall be tightened and the hydrants shall be inspected in open and closed position to see that all parts are in working condition.

21. VALVE BOXES

All valves (gate, air release, check, etc.) Installed underground shall be installed in an approved valve box. Each gate valve shall be installed in a vertical position with a valve box. Valve boxes shall be of cast iron, two piece, screw-type consisting of a base, a center section and a top section with a cover marked "**water**". Where valve box is constructed in a paved area the box shall be a screw type box. The entire assembly shall be adjustable for elevation and shall be set vertically and be properly adjusted so that the cover will be in the same plane as the finished street surface (no more than 1/2" above ground in yards or pastures of 2" in unsodded areas) at the installation site and shall rest on concrete pads as shown in the Standard Details. The CONTRACTOR shall furnish 2 valve wrenches for the project.

Tracer wire will be brought up the outside of the valve box with a notch in the top sec and a minimum of 6ins of the wire put down inside of the box under the cap. Tracer wire will be taped to top of pipe @ a max of 7ft intervals.

22. BLOW-OFF VALVES

Blow-off valves shall be installed in accordance with the details and the specifications at locations shown on the plans and in other locations as directed by the ENGINEER. In some instances fire hydrants serve as blow-off valves. In general, blow-off valves are located at the end of mains for the purpose of clearing the main of sediment, obstacles or impure water. The CONTRACTOR should refer to the Standard Details for blow-off installation.
The blow-off pipe from the main to the flush valve shall be connected to the main by means of a 90. The gate valve for the blow-off connection shall be a resilient seat gate valves in conformance with AWWA C509 for sizes 4" and larger. The gate valve shall be installed 10ft before the MJ C153 90 Bend the PVC pipe will be notched 4in above the 90 to allow for drainage, and plastic cap over end of pipe ***(not glued)***. The valve & 90 to be secured with (RGRAPIPU) Grip ring trans packs and thrust block.

23. TAPPING SLEEVE AND VALVE

A Ford tapping sleeve and Kennedy valve or equal shall be used for making wet taps and shall be rated for a minimum working water pressure of 200 psi. CONTRACTOR shall ascertain the type and size of pipe to which the connection is to be made prior to selection. ***During the process of tapping an asbestos concrete main, the CONTRACTOR shall conform to OSHA Regulations governing the handling of hazardous waste.*** Pieces of asbestos concrete resulting from the tap shall be double bagged, placed in a rigid container, and disposed of in an approved landfill.

24. STATE HIGHWAY CROSSINGS

In all cases, these crossings will be made in compliance with the requirements of the Kentucky Transportation Cabinet. Such requirements will normally be described by District #7 Highway Office. In general, unless otherwise shown on the plans or directed otherwise by the DISTRICT, the crossing of all State Highways shall be accomplished by boring under the roadway. In

addition, the crossing of service lines 1-1/2 inches and greater under rigid and flexible surfaced paved roads shall be accomplished by boring and jacking a casing pipe under said roadway. In certain cases, as shown on the plans, service lines of all sizes will require casing pipe installed with the crossing.

25. OPEN TRENCH CROSSING.

The trench shall be excavated to a minimum width that will allow the pipe installation. The trench walls shall be kept as nearly vertical as possible. The minimum specified cover above the pipe shall be maintained. The Standard Details section shows the requirements for open trench crossings. The backfill in the trench under any roads, driveways, or parking areas where the open trench method is used shall be of the type shown in the Standard Details and shall be deposited and compacted in uniform layers not to exceed the depth shown in the Standard Details. The surface of the road, driveway, or parking area shall be replaced with the same type of material as specified under pavement replacement.

26. BORE AND JACK.

The work is herein defined as the operations in which both the boring by auger and the jacking of the casing pipe are done mechanically and in which the diameter of the casing pipe is too small to permit hand working at the heading of the casing pipe. Two basic methods are; (1) pushing the casing pipe into the fill or earth simultaneously as the boring auger drills out the ground; and (2) drilling the hole through the fill or earth and pushing the casing or carrying pipe into the hole after the drill auger has completed the bore.

A suitable approach trench shall be opened adjacent to the slope of the embankment, or adjacent to point of bored and jacked section as shown on the plans. The approach trench shall be long enough to accommodate the selected working room. Guide timbers or rails for keeping the casing pipe on line and grade shall be accurately set and maintained in the bottom of the approach trench and with heavy timber back-stop supports installed at the rear of the approach trench to adequately take thrust of the jacks without any movement or distortion.
It is paramount to the securing of acceptable tolerance limits of workmanship in the boring and jacking operation that extreme care be taken in the setting of all guides, rails and jacks to the end that casing pipe in final position be within the limits of acceptability for the placing and laying of the carrier pipes. The minimum cover of 36 inches under the roadway must be maintained. Additional depth may be required as shown on the plans.

In general, the diameter, thickness, style, joints and materials selected for casing pipe shall be as shown on the plans and shall be considered as “minimum” requirements, all subject to prior approval of the DISTRICT. In all cases, the approval for construction by agreement with the private company and/or construction permit issued by the State, County, or Municipal agency will be required before construction starts.

Steel casing pipe for road and railroad crossings using the boring and jacking method shall be steel, plain end, uncoated and unwrapped, and shall be furnished in at least 18-foot lengths. Steel

pipe shall meet the requirements of ASTM Specification A-120 and AWWA C200. Pipes up to and including 4 inches in diameter shall be Schedule 40. Pipe larger than 4 inches shall have a wall thickness equal to or greater than 0.312 inches under railroads and 0.250 for all other uses. The inside diameter of all casing pipes shall be a minimum of four (4") inches greater than the largest outside diameter of the carrier pipe, joint or coupling.

The steel casing pipe shall be bored and/or jacked in place at the locations as shown on the plans or as directed by the DISTRICT. All joints between lengths shall be solidly welded with a smooth non-obstructing joint inside. Any field welding shall be performed by a certified welder, and shall be in accordance with AWWA C206. The casing pipe may be extended beyond the boring limits by open trenching as shown in the Standard Details. This would apply when casing is required from right-of-way or ditch line to ditch line. Open trenching at jacked or bored locations will be allowed no closer than 3 feet from edge of pavement.

The ends of the casing pipe shall be plugged and made watertight in a manner acceptable to the DISTRICT prior to backfilling. Casing seals as manufactured by Pipeline Seal & Insulator, Inc. (PSI), Advanced Products & Systems, Inc. (APS) or equal shall be used.

Where road crossings are made using plastic pipe or copper, the location of joints under the roadway should be avoided by using lengths of adequate dimension for the crossing. This principle also applies to other types of pipe where sufficiently long lengths are available.

27. RAILROAD CROSSINGS

At all railroad crossings, cover pipe (casing) for water lines (carried pipe) shall be jacked or pushed beneath tracks and the carrier pipe joined and pushed through the cover pipe. Detailed drawings of railroad crossing including the length of casing and depth below track are shown in the plans. CONTRACTOR shall obtain and pay for services of a representative of the railroad to direct the CONTRACTOR'S operations while on the railroad property when required by the railroad. **Valves are to be installed on either side of all *Railroad* crossings.**

28. CREEK CROSSING (OPEN CUT)

Where required on the plans or instructed by the DISTRICT and approved by the Division of Water, the CONTRACTOR shall construct a creek crossing which shall be scheduled for construction in times of low flow, if practicable, otherwise cofferdams of sand bags or clay shall be used to divert the stream flow while crossing is made. Concrete shall not be placed under water and CONTRACTOR shall provide suitable pumps to keep water out of trench excavation during stream crossing construction. **Valves to be installed on either side of all *Creek Crossings* as soon as flat ground is reached with a bypass meter installed on the upstream valve.** Developer will be required to obtain all State and Federal Permits for all creek crossings.

29. CREEK, RIVER, OR LAKE CROSSINGS (DIRECTIONAL BORES)

Crossings in creeks, rivers or lakes where the pipe cannot be laid in a trench shall normally be made with a directional bore having polyethylene encasement and carrier pipe (HDPE) as indicated on the DRAWING. Special adapters, couplings, saddles and restraint system shall be supplied by the CONTRACTOR to restrict expansion and contraction of the HDPE pipe. CONTRACTOR shall install silt fences between all boring operations and any drainage, wetland, waterway or other area designated for such protection.

30. WATER LINE AND SEWER SEPARATION

30.1 General.

Whenever sewer lines cross, or are adjacent to, each other, special precautions shall be taken.

30.2 Parallel Water and Sewer Lines.

Water lines must, if possible be located a minimum lateral distance of 10 feet from any existing or future sewer lines measured for outside diameters. ***Where water lines and sewer lines must be placed in the same trench, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line.*** Whenever this condition cannot be met, and upon direction from the DISTRICT, the water line shall be uncovered and encased with concrete per the standard encasement detail.

30.3 Crossing Water and Sewer Lines**.**

Wherever sewer lines and water lines cross, it is desirable, if practical, that the sewer line be at least 24 inches below the water line. Where it is not practical to provide such a separation, care shall be taken to ascertain that the existing water line or existing sewer line is in good sound condition and that no evidence of joint leakage is known in the vicinity. If any such evidence does exist, the existing line shall be exposed by the CONTRACTOR at least 10 feet each side of the new pipe crossing, carefully examined and any defects positively corrected. *The DISTRICT will arrange for examining and correcting any defects in the existing lines, but the CONTRACTOR shall cooperate in every way possible.* ***When the water line must be below or less than 2 feet above the sewer line, the CONTRACTOR shall encase the water line 10 feet in each direction from the crossing as directed by the DISTRICT.*** This encasement should only be accomplished when directed by the DISTRICT and shall be accomplished in accordance with the details shown on the drawings.

32. SEEDING

Upon completion of the installation of the work, ***the CONTRACTOR shall remove all debris and surplus construction material resulting from the work.*** The CONTRACTOR shall fine grade all the disturbed surfaces around the area of the work in a uniform and neat manner leaving the construction area in a condition as near as possible to the original ground line or to the lines as directed by the DISTRICT.

All grade areas shall be left smooth and thickly sown with a mixture of grasses. The mixture of grasses shall consist of one-third (1/3) Rye grass, one-third (1/3) Kentucky Fescue and one-third (1/3) Kentucky Bluegrass by weight, and shall be applied to the graded areas at a rate of not less than 1 pound of seed per one thousand square feet of area. When the final grading has been completed, the entire graded area to be seeded shall be fertilized with 12-12-12 fertilizer, applied at the rate of 6 pounds per one thousand square feet of area. After the seed and fertilizer both have been applied, the CONTRACTOR shall then lightly cover the seed by use of a drag or other approved device. The seeded area shall then be covered with straw a depth of approximately 1 inch. *New Sod damaged by the CONTRACTOR shall be replaced with new sod by the CONTRACTOR at no cost to the DISTRICT.*

The fine grading, seeding, sodding and clean up shall be considered as incidental expense and shall not be separate pay items.

Meadows and hay fields will require replacement in kind unless the CONTRACTOR secures a release from the property OWNER agreeing to no replacement or alternate replacement.

32. PAVEMENT AND OTHER STRUCTURE REPLACEMENT

The CONTRACTOR shall replace all pavement cut or disturbed, with pavement similar in all respects to existing pavement in accordance with the Standard Details and at those locations approved by the DISTRICT. Every effort shall be made to avoid cutting the pavement. In restoring pavement, new pavement is required, except that granite paving blocks, sound brick or sound asphalt paving blocks may be reused. No permanent paving shall be placed within thirty (30)-days after the backfilling has been completed. All concrete and asphalt paving materials shall be in conformance with the Standard Details shown in the plans.

32.1 Classification of Pavements

32.1.1. Concrete Pavement Replacement

This pavement replacement shall be Portland cement concrete construction in accordance with the requirements shown in the Standard Details. It shall include all pavement replacement on concrete surfaced roads, concrete driveways, concrete sidewalks and concrete parking areas, both public and private.

32.1.2. Heavy-Duty Bituminous Pavement Replacement

This type of asphalt pavement replacement shall be bituminous concrete surface over concrete base in accordance with the details. This type of pavement replacement shall be used on all heavily trafficked roads having an existing pavement greater than 2", whether public or private, or in other locations as directed by the DISTRICT.

32.1.3. Light-Duty Bituminous Pavement Replacement

This type of pavement replacement shall be bituminous concrete constructed in accordance with the details. This item shall include all light-duty bituminous concrete roadways, bituminous driveways and bituminous parking lots, both public and private.

32.1.4. Crushed Stone Surface Replacement

This type of surface replacement shall include all graveled roadways, driveways, parking areas, or other gravel surfaced areas, both private and public. This type of surfacing may also be required as a base course for other pavement replacement.

32.2. Materials.

The crushed stone backfill as noted on the drawings shall be dense graded aggregate per Kentucky Department of Highways Specifications. The CONTRACTOR shall continuously be responsible for the maintenance of the aggregate and the surface of the trenches until the pavement replacement is completed. Portland cement concrete for pavement replacement shall contain a minimum of 6 gallons per sack of cement, the slump shall be between 2 and 4 inches, and the concrete shall have minimum 28-day compression strength of at least 3,500 PSI. Cement, aggregate and water shall be described in these specifications for Class "A" concrete. A set of cylinders shall be made and tested for each 25 cubic yards of concrete placed, or fraction thereof, to supply representative sampling and testing of the concrete, upon the direction of the DISTRICT. The CONTRACTOR shall produce a broomed, or burlaped uniformly smooth and nonskid surface, consistent with the existing pavement. Bituminous materials and mixes shall be consistent with the recommended practice of the asphalt institute and it shall conform to the requirements of the Kentucky Department of Highways for prime coat and Class 1 bituminous concrete. The bituminous concrete shall consist of a binder or base course and a surface course.

32.3 Installation of Pavement Replacement.

The CONTRACTOR shall cut back the surfacing adjacent to the trench for 12 inches on both sides of the trench and shall cut down the dense graded aggregate he has placed to a depth required for either type of pavement replacement. The resulting surface shall be rolled to yield a smooth, dense surface and a uniform depth.
The concrete shall be placed in accordance with standard practice, with the welded wire mesh if required in proper position and thoroughly vibrated into place. The CONTRACTOR shall produce a surface consistent with the existing pavement. The CONTRACTOR shall apply a liquid curing component, sprayed on the surface of the concrete, and shall provide adequate protection to the pavement until it is set.

For bituminous concrete, the CONTRACTOR shall clean and broom the prepared surface, then apply the prime coat at the rate of 0.20 to 0.25 gallons per square yard, with a pressure distributor or approved pressure spray method. When the prime coat has become tacky by not dry and hard, the bituminous binder course, or base course, whichever applies, shall be placed

and compacted. The CONTRACTOR shall then apply the surface course. It is recommended, but not required, that the base course remain in place for approximately one week before placing the surface course. The finished course shall be compacted and the completed surface shall match the grades and slopes of the adjacent existing surfacing and be free of offsets, depressions, raised places and all other irregular surfaces.

32.4 Seasonal and Weather Limitations for Pavement Replacement.

In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid when the temperature is below 40*F. except by written permission of the DISTRICT.

Concrete pavement shall not be placed when the temperature is such that the pavement placed will freeze before it has had adequate time to set and shall be placed in conformance with the temperature conditions specified in Section 3 of these specifications.

The CONTRACTOR shall be responsible for replacement of pavement which he has placed has been damaged by cold weather or freezing without additional compensation.

In the meantime, the CONTRACTOR will be required to ***maintain*** the temporary surfacing until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways and driveways shall be provided at the CONTRACTOR'S expense and is not a pay item. The CONTRACTOR will be required to use a cold mix asphaltic concrete as a temporary surface for trenches under heavy traffic use.

32.5 Guarantee.

The one-year guarantee as specified in the contract documents is also applicable to trench settlement and pavement replacement.

33. SIDEWALK REPLACEMENT

Sidewalks will be replaced if damaged by the CONTRACTOR in any way. Payment will be made for those sidewalks necessarily damaged by the line installation in accordance with the Standard Details. No sidewalks are to be replaced over a backfilled trench for at least 30 days after filling. Sidewalks damaged otherwise are to be replaced immediately at the CONTRACTOR'S expense. Materials and dimensions are to be at least equal to existing walk and are to conform to the Standard Details.

34. FINAL CLEAN-UP

The CONTRACTOR shall provide effective cleanup of the work as it progresses. ***Procrastination of cleanup will not be tolerated.*** At the time of final inspection, no trenches shall show any undue evidence of the previous construction. All areas shall be left free of ruts due to construction equipment and shall have a clean and neat appearance without rubble or debris.

The areas shall not be mounded up and shall be completely restored, and all yards and fields shall be completely reseeded so land may be cultivated, mowed, etc. Straw and fertilizing shall accompany the seeding in accordance with Item 8 - Seeding of this section. If necessary to hasten proper restoration of terraces, principally along ditch lines, the CONTRACTOR shall seed such areas at the DISTRICT'S direction. For all line segments, final cleanup shall be performed within 30 days from day of installation.

35. PROTECTION OF ADJACENT LANDSCAPE

Reasonable care shall be taken during construction of the water lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

In the course of construction, the CONTRACTOR may deflect horizontal alignment of the water line (with DISTRICTS approval) to avoid trees and to keep from damaging their roots. ***The CONTRACTOR shall be fully responsible for settling all claims by private property owners concerning damage to trees and shrubs.***

36. GENERAL GUIDELINE FOR TESTING AND STERILIZATION

The following procedures are intended only as a general guideline. The order of the steps is very important and must not be deviated. All procedures must be completed with inspection by a representative from or designated person for Madison County Utilities District.

Step 1. Filling new main with water: Provision for adding chlorine or chlorine compounds should be made at this time. ***Chlorine shall be added in sufficient to produce a free residual of not less than 50 parts per million. This 50-part solution must remain in contact with the new main for a minimum of 24 hours.*** At the end of the minimum 24 hour period, a residual of not less than *25 parts per million* must be observed.

Step 2. **Flushing and dechlorination** of all chlorinated water must be accomplished at this time by industry accepted practices.

Step 3. New mains must be flushed sufficiently to expel any air, dirt, or foreign debris.

Step 4. The appropriate number of bacteriological water samples must be collected from the new main in accordance with Kentucky regulations.

Step 5. After clear or negative bacteriological water samples have been verified by an approved facility, then hydrostatic testing must be conducted. After completion of the successful hydrostatic test, new main can be put into service.

37. TESTING

37.1. Pressure Test

After the pipe has been laid, and after sterilization, dechlorination, flushing, and clear samples received, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure test of at least **1.5 times** the working pressure or a **minimum of 150 psi** at the point of testing, but in no case less than that required by other sections herein. In addition, a leakage test shall be conducted concurrently with the pressure test.

Test pressure shall: ***Not be less than*** 1.50 times the working pressure at the highest point above the test section.

Not exceed pipe or thrust restraint design pressures at the lowest point along the test section.

Be of at least four ***(4) hour duration***.

Not vary by more than plus or minus **5 psi.**

Not to exceed twice the rated pressure of the valves or hydrants when the pressure of the test section includes closed gate valves or hydrants.

Not exceed the rated pressure of resilient gate valves used.

Each Valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the DISTRICT.

Before applying the specified test pressure, ***air shall be expelled completely from the pipe, valves, and hydrants.*** *If permanent air vents are not located at all high points, the contractor shall install corporation stops at such points so that the air can be expelled as the line is filled with water.* After all the air has been expelled, the corporation stops shall be closed and the test pressure applied. ***All Valves*** **to Fire Hydrants shall be open for the duration of the test.** At the conclusion of the pressure test, the corporation stops shall be removed and plugged, or left in place at the discretion of the DISTRICT.

All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the DISTRICT.

37.2 Leakage

When hydrants are in the test section, the test shall be made against the closed hydrant.

All visible leaks are to be repaired regardless of the amount of leakage.

38. STERILIZATION

38.1 General.

It is the intent of this section to present essential procedures for disinfecting new and repaired water mains. The section is patterned after AWWA C651-92. The basic procedure comprises:

Preventing contaminating materials from entering the water mains during construction or repair and removing by flushing materials that may have entered the water main.

Disinfecting any residual contamination that may remain.

Determining the bacteriologic quality by laboratory test after disinfection.

38.2 Preventive Measures During Construction

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipe laying is not in progress, as, for example***, at the close of the day's work, all openings in the pipeline shall be closed by watertight plugs. Joints of all pipe in the trench shall be completed before work is stopped.*** If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

If dirt enters uninstalled pipe; and in the opinion of the DISTRICT, will not be removed by the flushing operation (ARTICLE 2.3), the interior of the pipe shall be cleaned and swabbed as necessary, with five (5%) percent hypochlorite disinfecting solution.

38.3 Preliminary Flushing.

The main shall be flushed prior to disinfection, except when the tablet method is used (ARTICLE 2.5.3). It is recommended that the flushing velocity be not less than 2.5 ft. /sec. *No*

site for flushing should be chosen unless it has been determined that drainage is adequate at the site.

TABLE K2

REQUIRED OPENINGS TO FLUSH
PIPELINES (40-psi Residual Pressure)

Pipe Size (In)	Flow Required to Produce 2.5 fps Velocity (gpm)	Orificice Size (in)	Number	Size (in)
4	100	15/16	1	2 ½
6	220	1 3/8	1	2 ½
8	390	1 7/8	1	2 ½
10	610	2 5/16	1	2 1/2
12	880	2 13/16	1	2 1/2
14	1,200	3 1/4	2	2 1/2
16	1,565	3 5/8	2	2 1/2
18	1,980	4 3/16	2	2 1/2

38.4 Form of Chlorine for Disinfection.

The most common forms of chlorine used in the disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, and sodium hypochlorite solutions.

38.4.1 Liquid Chlorine

Liquid chlorine shall be used ***only*** when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. ***Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.***

NOTE: The preferred equipment consists of a solution fed chlorinator in combination with a booster pump for injecting the calcium hypochlorite mixture into the main to be disinfected. *Direct feed chlorinators are not recommended.*

38.4.2 Hypochlorites

38.4.2.1 Calcium Hypochlorite

Calcium hypochlorite contains seventy (70%) percent available chlorine by weight. It is either granular or tabular in form. The tables, 6-8 to the ounce, are designed to dissolve slowly in water. Calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to one hundred (10) pound drums.

A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

38.4.2.2 Sodium Hypochlorite

Sodium hypochlorite is supplied in strengths from five and one- quarter (5.25%) to sixteen (16%) percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one (1) quart bottles to five (5) gallon carboys. It may also be purchased in bulk for delivery by tank trucks.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applicants, the solutions may fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

38.5 Methods of Chlorine Application

38.5.1 Continuous Feed Method

This method is suitable for general application. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly laid pipeline. The water shall receive a done of chlorine, also fed at a constant measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods and AWWA M12--Simplified Procedures for Water Examination.

NOTE: In the absence of a meter, the rate may be determined either by placing a pitot gauge at the discharge or by measuring the time to fill a container of know volume.

TABLE K-3 gives the amount of chlorine residual required for each one hundred (100) feet of pipe of various diameters. Solutions of one (1%) percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately on (1) pound of calcium hypochlorite in eight and five tenths (8.5) gallons of water.

TABLE K-3
CHLORINE REQUIRED TO PRODUCE 50 Mg/1
CONCENTRATION IN 100 FT. OF PIPE (BY DIAMETER)

Pipe Size (in)	100 Percent Chlorine (lb)	1 Percent Chlorine Solutions (gal)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least twenty-four (24) hours during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this twenty-four (24) hour period, the treated water shall contain no less than 25 mg/1 chlorine throughout the length of the main.

38.5.2 Slug Method

This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (see ARTICLE 2.5.1.1) into the newly laid pipeline. The water shall receive a dose of chlorine also fed at a constant, measured rate. The tow rates shall be proportioned so that the concentration is the water entering the pipeline is maintained at no less than 300 mg/1. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or “slug” of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least three (3) hours.

The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements.

As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated as to disinfect appurtenances.

38.5.3 Tablet Method.

The tablet method consists of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water when installation is completed.

This method may be used only if the pipes and appurtenances are kept clean and dry during construction and are filled and placed in service within a two-week period. This method shall be approved by the DISTRICT prior to its use. *The use of this method may be terminated, if in the opinion of the DISTRICT, the conditions of approval are violated.*

Specific procedures for this method may be found in ANSI/AWWA C651-92, Section 5.1.

38.6 Final Flushing.

38.6.1 Clearing the Main of Heavily Chlorinated Water.

After the applicable retention period, the heavily chlorinated water shall not remain in prolonged contact with the pipe. This water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that prevailing in the system, or less than 1 mg/l. Chlorine residuals determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.

38.6.2 Disposing of Heavily Chlorinated Water.

The environment into which the chlorinated water is to be discharged shall be inspected. A neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix B of ANSI/AWWA C651-92 for neutralizing chemicals.) Federal, state, provincial, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

38.7 Bacteriologic Tests

After line flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least on sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main.

Samples for bacteriologic analysis shall be collected by ***Madison County Utilities*** in sterile bottles treated with sodium thiosulfate.

38.8 Repetition of Procedure.
If the initial disinfection fails to produce satisfactory samples, disinfection and flushing shall be repeated until satisfactory samples have been obtained. ***The tablet method cannot be used in these subsequent disinfection.***

38.9 PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

38.9.1 General

The procedures outlined in this Article apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

38.9.2 Main Disinfection:

The following procedure is considered as a minimum that may be used.

38.9.2.1 Swabbing With Hypochlorite Solution

The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five (5%) percent hypochlorite solution before they are installed.

38.9.2.2 Flushing

Through flushing is the most practical means of removing contamination introduced during repairs. ***If valving and hydrant locations permit, flushing from both directions is recommended.*** Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

38.9.2.3 Slug Method

Where practicable, in addition to the procedures ARTICLE 2.9.2.1, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in ARTICLE 2.5.2, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as one-half (1/2) hour.
After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

38.9.3 Sampling

Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken per state regulations.

Madison County Utilities District

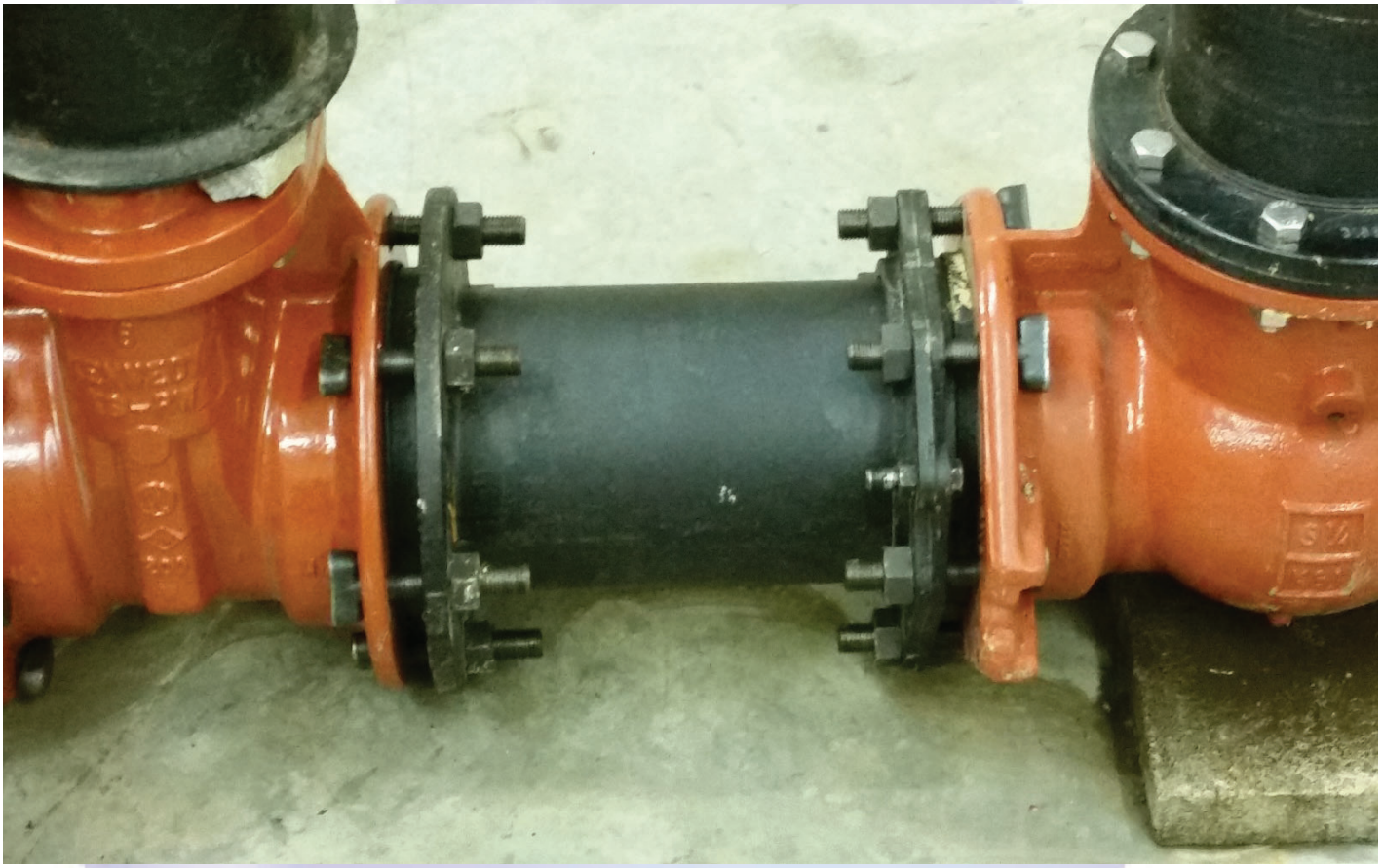
IV. STANDARD DRAWINGS AND DETAILS

Madison County Utilities District

Tee, Valves, Fire Hydrant

Madison County Utilities District

18” Swivel Adapter on all Valve to Fire Hydrant connections

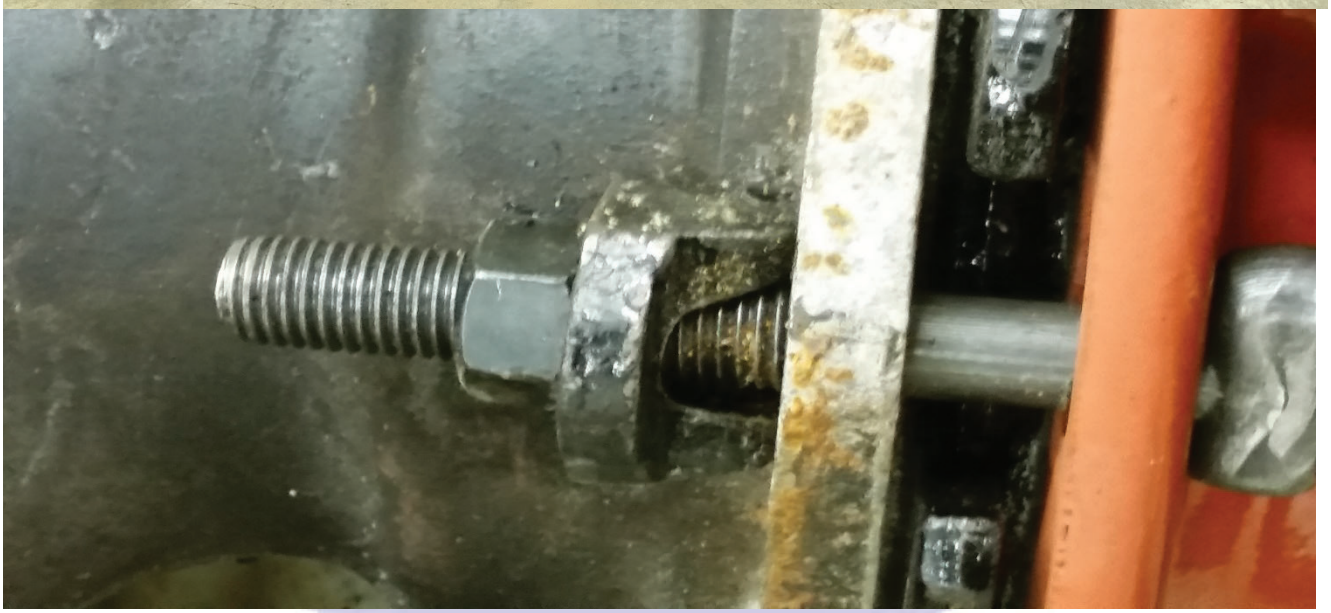


Valve Side (Solid)

Hydrant side (Swivel)

Madison County Utilities District

Tee, Valves, Fire Hydrant



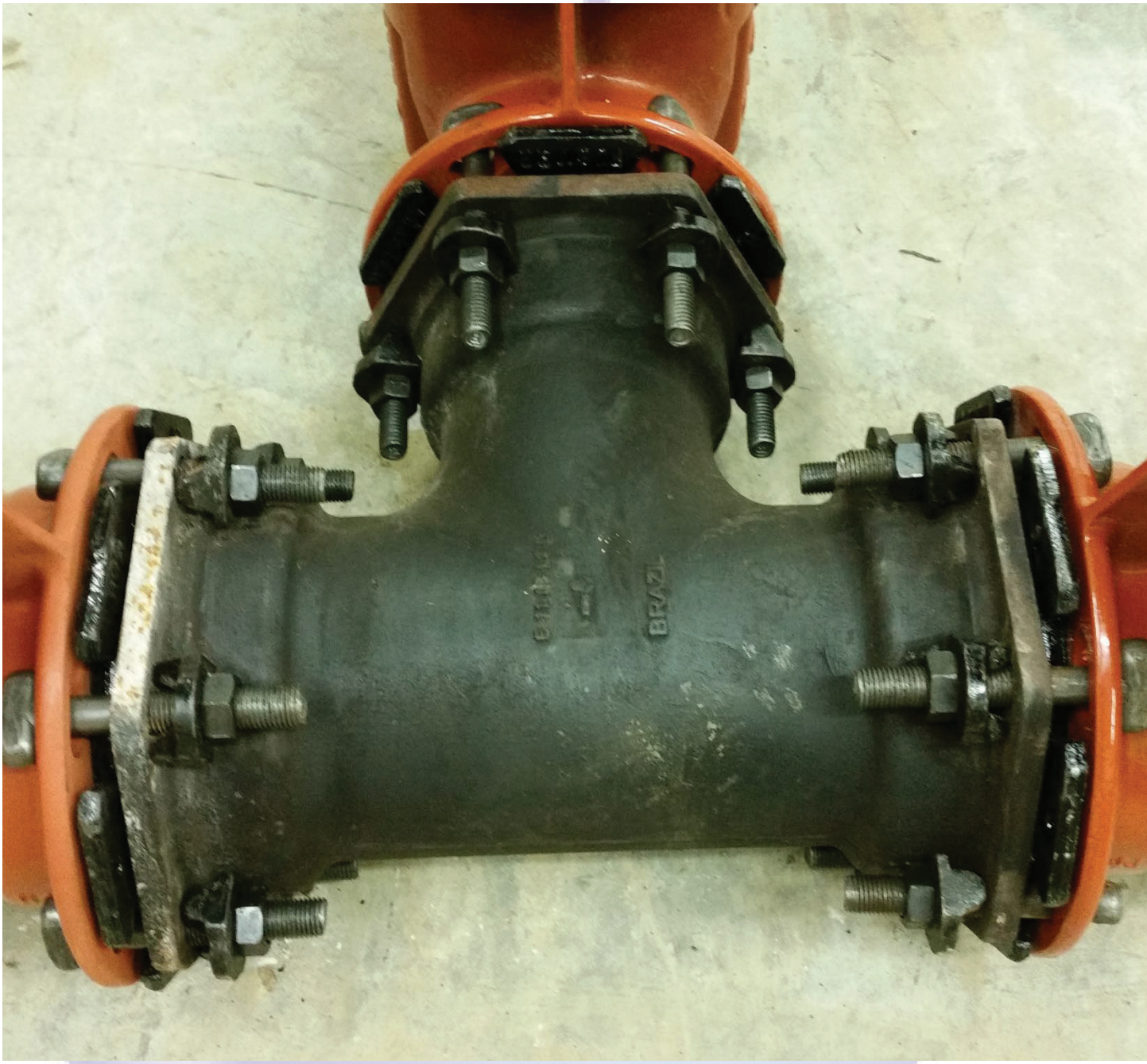
Madison County Utilities District

Taped 12in out from flange, tracer wire ran up outside of valve box

Madison County Utilities District

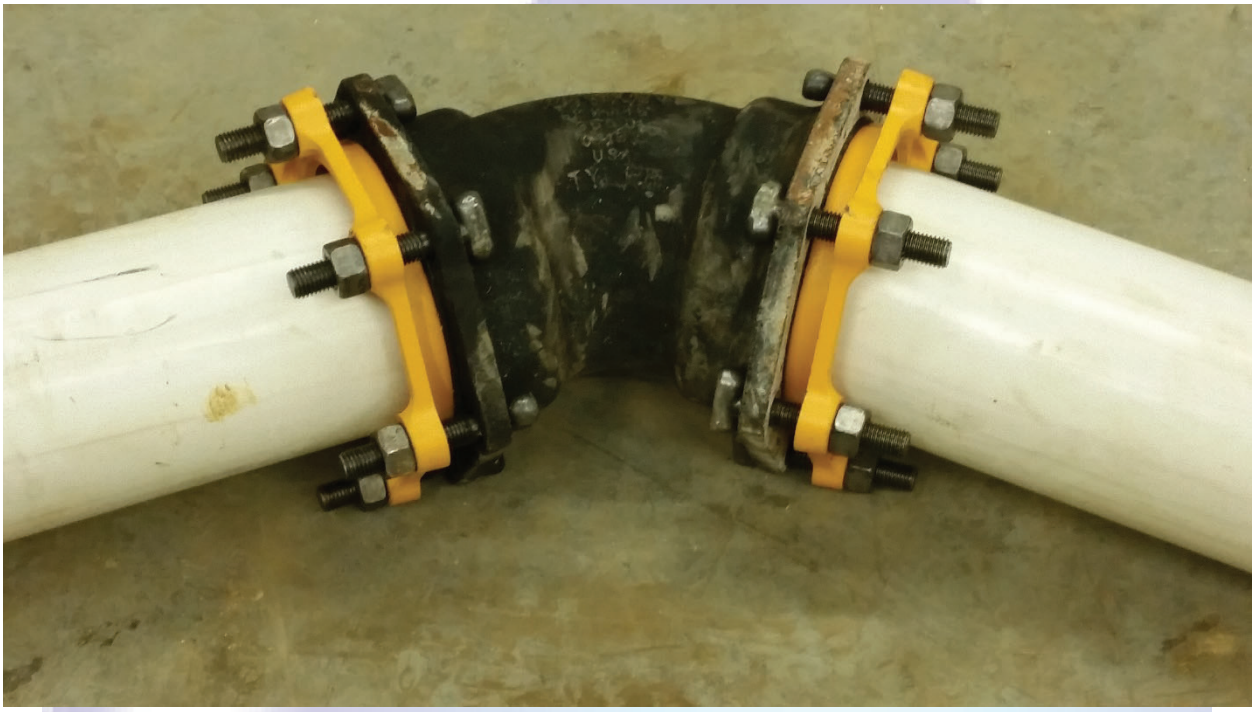
8 to 12in of tracer wire folded inside of valve box

Madison County Utilities District



Madison County Utilities District

All bends use appropriate *Grip Rings*

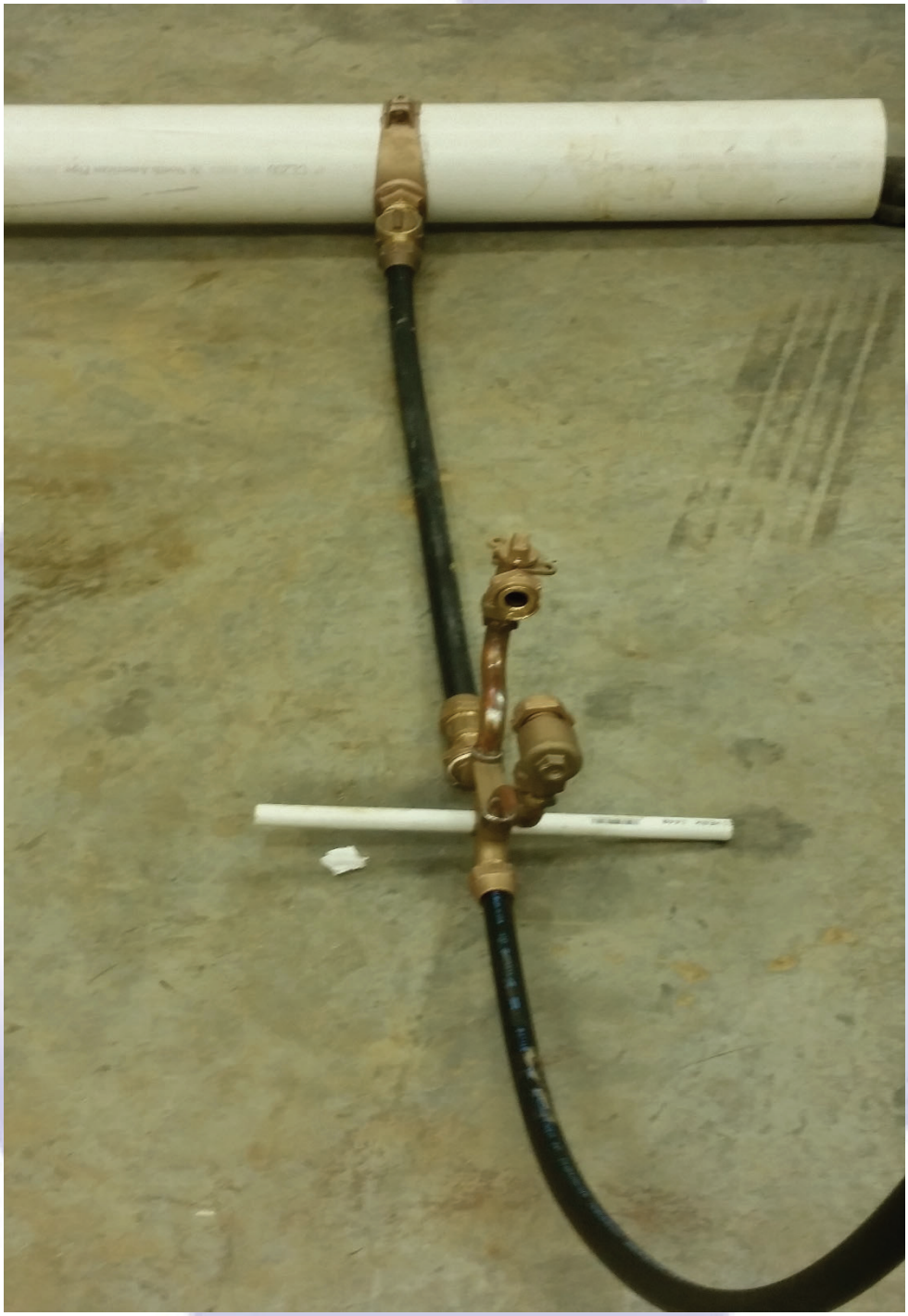


Madison County Utilities District

Air release Valve with Shut Off

Madison County Utilities District

Meter Setter with ½" stabilizing pipe



V. DESIGN STANDARDS

1. SIZE OF WATER MAINS

A. The minimum size of water main generally shall be six-inch diameter. For dead end streets (which will not be extended) four-inch diameter may be used upon the General Managers approval for short runs.

B. Water distribution system shall be sized, as a minimum, to deliver demand flow of either:

1.) Maximum hour demand or maximum daily demand flow with minimum thirty pounds per square inch (30 psi) at all points in the system extension.

2.) Average daily demand flow with applicable fire flow rate and a minimum of 20 psi at all points in the system extension.

3.) Average daily demand flow with applicable flushing rate and a minimum of 30 psi at all points in the system extension.

C. System wide the following guidelines are utilized to determine demand flow:

1.) Average daily residential demand flow is 215 gallons per day.

2.) Maximum hour factor is 1.75

3.) Maximum day factor is 1.5

D. Within a new project area or subdivision the following guidelines are utilized to determine demand flow:

1.) Average daily residential demand is 300 gallons per day

2.) Commercial, institutional or industrial demand shall be specifically determined

3.) Maximum hour factor is 3.5 x Average Dailey Demand

4.) *Flushing flows are* ***250 gpm for 6", 400 gpm for 8", and 800 gpm for 12" lines.*** E. Design computations shall be accomplished utilizing the Kentucky Pipe Program or other approved method. The Hydraulic analysis shall assure that existing system has the

capacity to provide the demand flow not only for the proposed extension but also for the existing customer base.

F. For systems requiring Fire Protection, a minimum flow of 250 gpm with a residual pressure of 20 psi are generally the minimum allowable requirements. Fire hydrant spacing within developments will generally be a fire hydrant installed every 500 lineal feet.

2. GENERAL STANDARDS

A. Water lines shall be typically installed in a twenty-foot (20 ft.) easement outside of the public right-of-way. Crossings shall be made across right-of-ways. Any water lines running between two proposed dwellings along property lines may require additional easement width or special construction techniques.

B. Service lines shall be installed for all lots with magnetic detector device and temporary flag (steel post) showing location.

C. All road crossings, either mains or services shall typically be at right angle to roadway.

D. *Valves shall generally be provided for each direction of pipe branches, fire hydrants stubs and such that no more than 800 feet of main should be shut down at any time.*

E. When dead-ends occur, a fire hydrant (in fire protection systems) or a blow-off shall be installed. Blow-off devices shall be sized to provide at least **2.5** feet per second of velocity in the main.

F. At high points in water mains were air can accumulate provisions shall be made to remove the air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur.

G. Water lines within a 200-foot radius of oil or gasoline lines, underground storage tanks, petroleum storage tanks or pumping stations shall be constructed of ductile iron pipe. Pipe joint materials which are resistant to permeation of the petroleum products shall be used within the 200-foot radius.

H. The minimum size of water main for providing fire protection and serving fire hydrants shall be six-inch diameter. Larger size mains will be required, if necessary, to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure. Hydrants on lines either less than six inches in diameter shall be for flushing purposes only.

3. STANDARDS FOR CONSTRUCTION DRAWINGS

A. Typical Scale is 1” = 50’ with Maximum Scale of 1” = 100’

B. Drawn on 24" x 36" plan sheet and computerized representation (Disc.) of proposed development in auto-cad format.

C. Show existing and proposed property lines with lot numbers from development plat.

D. Show all existing utilities and proposed utilities.

E. Show location and typical section of existing and proposed roadways.

F. Show all existing and proposed storm water facilities.

G. Show location survey control monuments.

H. Show vicinity map.

I. Show north arrow

J. Show location of all proposed water mains, valves, hydrants, service lines and blow- offs.

K. Show all right-of-way areas and easement areas.

L. Provide profile of proposed water line.

VI. APPROVED MATERIALS LIST FOR WATER MAIN CONSTRUCTION

PVC Pipe
Certainteed
North American Pipe Co. Diamond
J and M

Ductile Iron Pipe
American
Clow
MC Wayne
U.S. Pipe & Foundry

Polyethylene Tubing
¾" – 1" Prisma (Performance) or Ednopoly Premium 200 PSI Ultra High Density PE3408
Performance 4000 (Ductile Iron Pipe Size)

Fire Hydrants 5 ¼" Valve Opening, Mechanical Joint
Kennedy

Gate Valves and Tapping Valves, Mechanical Joint, Resilient Wedge
Kennedy

Ductile Iron Fittings, Mechanical Joint, Cement Lined, Class 350
U.S. Pipe & Foundry

Tapping Sleeves, Stainless Steel Wrap Around
Ford

Brass Materials
Ford
Mueller

Air Relief Valve

V15A2	¾"	"AIR RELEASE VLV"
V15A3	1"	"AIR RELEASE VLV"

Madison County Utilities District

Grip Rings to be used on all MJ fittings

RGRAPIPP	4" GRIP RING W/ACC	PK PVC
RGRAPIPU	6" GRIP RING W/ACC	PK PVC
RGRAPIPX	8" GRIP RING W/ACC	PK PVC
RGRAPDIP	4" GRIP RING W/ACC	PK DI
RGRAPDIU	6" GRIP RING W/ACC	PK DI

SWIVEL ADPT (18"Min) to be used between all valves and fire hydrants

MJSHAU18	6" X 18" SWIVEL ADPT

SECTION 02665
WATER MAINS AND ACCESSORIES

PART 1 GENERAL

1.1 SCOPE

A. **SEE MADISON COUNTY UTILITIES DISTRICT STANDARDS AND SPECIFICATIONS**. Where any discrepancies arise, the stricter standard will be applied. This Section describes products to be incorporated into the water mains and requirements for the installation and use of these items. Furnish all products and perform all labor necessary to fulfill the requirements of these Specifications.

B. General: Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.2 QUALIFICATIONS

A. If requested by the ENGINEER, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.

1.3 SUBMITTALS

A. Complete shop drawings and engineering data for all products shall be submitted to the ENGINEER in accordance with the requirements of Section 01340 of these Specifications.

1.4 TRANSPORTATION AND HANDLING

A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.

B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front-end loader. Do not use material damaged in handling. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

1.5 OWNER FURNISHED MATERIALS – N/A

A. Submit with construction progress schedule, a schedule for required deliveries of Owner furnished Material.

B. The Contractor shall coordinate material shipments with the Owner and the materials suppliers.

C. Materials furnished by the Owner will be delivered by truck. Pipe, fittings, valves and other material to be furnished by the Owner shall be delivered to the Owner's storage yard or another site agreed upon by the Contractor and the Owner. This other site, if selected, is to be provided by the Contractor at no additional cost to the Owner.

D. The Contractor shall maintain communication with the material suppliers, and the Owner as necessary, to keep informed as to scheduled shipment, and upon notice to the Contractor of the delivery of materials, the Contractor hall proceed without delay to unload such materials.

E. Upon receipt of materials from the manufacturer, the Contractor shall make an inspection of such materials, checking and certifying the bill of lading, noting any discrepancies and obtaining a proper memorandum signed by the agent of the carrier for any shortage in the shipment, or for any damaged materials received. All bills of lading and any memorandum for shortage or damage of material in the shipment shall be promptly submitted to the Engineer. The Contractor shall be responsible for distribution of all materials as required to complete the Work. Materials furnished to the Contractor shall be in the custody of the Contractor from the time of receipt by the Contractor of such materials from the carrier until final acceptance of the completed Work. The Contractor shall be responsible for any loss of damage to materials furnished by the Owner.

1.6 STORAGE AND PROTECTION

A. Store all pipe which cannot be distributed along the route. CONTRACTOR shall make arrangements for the use of suitable storage areas.

B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.

D. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

F. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.7 QUALITY ASSURANCE

A. The manufacturer shall provide written certification to the ENGINEER that all products furnished comply with all applicable requirements of these Specifications.

PART 2 PRODUCTS

2.1 PIPING MATERIALS AND ACCESSORIES

A. Ductile Iron Pipe (DIP)

1. Ductile iron pipe shall be manufactured in accordance with AWWA C151 (latest edition). All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings. All pipe shall have a minimum pressure rating as indicated in the following table, and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings:

Pipe Sizes (inches)	Pressure Class (psi)
4 - 12	350
14 - 18	250
20	250
24	200
30 - 54	250

2. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.
3. Pipe and fittings shall be cement lined in accordance with AWWA C104 (latest edition). Pipe and fittings shall be furnished with a bituminous outside coating.

4. Fittings shall be ductile iron and shall conform to AWWA C110 or AWWA C153 (latest edition) with a minimum rated working pressure of 250 psi or as indicated on plans.
5. Joints

    a. Unless shown or specified otherwise, joints shall be push-on or restrained joint type for pipe and standard mechanical, push-on or restrained joints for fittings. Push-on and mechanical joints shall conform to AWWA C111 (latest edition). Restrained joints for pipe and fittings shall be American "FLEX-RING" or "LOK-RING", Clow "SUPER-LOCK", or U.S. Pipe "TR FLEX". No field welding of restrained joint pipe will be permitted. No mega lug type restraints are allowed on 24" and 30" water line.
    b. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet.
    c. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.

6. Provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of 1/8-inch thick, cloth reinforced rubber; gaskets may be ring type or full-face type.
7. Provide the necessary bolts for mechanical, restrained and flange connections. Bolts for flange connections shall be steel with American Regular unfinished square or hexagon heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B17.2. All bolts and all nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A and 2B fit. Mechanical joint glands shall be ductile iron.
8. Acceptance will be on the basis of the ENGINEER’S inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.
9. If the water main is located within 200 feet radius of an underground storage tank (UST), special rubber gaskets shall be provided for the water main joints. These gaskets shall be manufactured of “nitrate rubber” material or other acceptable material possessing superior resistance to deterioration from petroleum-based products. This requirement will apply to the gaskets supplied for mechanical joints and push-on joints.

B. Polyvinyl Chloride Pipe (PVC)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to ASTM D 2241. The pipe shall have a Standard Dimension Ratio as indicated on the plans. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 (latest edition) with a minimum rated

working pressure of 200 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided as recommended by the manufacturer to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings, or valves.

3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the ENGINEER'S or OWNER'S inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

C. Polyvinyl Chloride Pipe (PVC) - (C-900)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to AWWA C900, ductile iron pipe equivalent outside diameters. **The pipe shall have a Standard Dimension Ratio (DR) of 21 and shall be capable of withstanding a working pressure of 200 psi**. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of 250 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided, as recommended by the manufacturer, to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings or valves.
3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the ENGINEER'S inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

D. Polyethylene Pipe and Fittings

1. The CONTRACTOR shall furnish and install high density polyethylene pipe meeting these Specifications at the locations indicated on the Plans and in other sections of these Specifications.

    a. High Density polyethylene pipe shall be manufactured and tested in conformance to the requirements of the latest revision of the American Society for Testing and Materials designation ASTM D-3350 "Polyethylene Plastic Pipe and Fittings Materials".
    b. High density Polyethylene pipe shall have a grade designation of PE 3406 and a cell classification designation of P 355434C.

c. High density polyethylene pipe shall be joined by means of butt fusion.

d. Fittings for high density polyethylene pipe shall be manufactured of the same materials as the pipe. Unless otherwise indicated, all fittings shall be joined to the pipe by butt fusion techniques.

2.2 VALVES

A. Gate Valves (GV)

1. 3-Inches in Diameter and Smaller: Gate valves shall be bronze, heavy duty, rising stem, wedge type with screwed or union bonnet. Valve ends shall be threaded or solder type as appropriate. Valves shall have a minimum 200 psi working pressure for water (125 psi working pressure for steam). Valves shall be made in the U.S.A. Gate valves shall be equal to Crane No. 428 (threaded) or Crane No. 1334 (solder end).
2. 4-Inches Through 12-Inches in Diameter: Gate valves 4-inches through 12-inches shall be resilient wedge type conforming to the requirements of AWWA C509 rated for 200 psi working pressure.

    a. Valves shall be provided with two O-ring stem seals with one O-ring located above and one O-ring below the stem collar. The area between the O-rings shall be filled with lubricant to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. At least one anti-friction washer shall be utilized to further minimize operating torque. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.

    b. The valve gate shall be made of cast iron having a vulcanized, synthetic rubber coating, or a seat ring attached to the disc with retaining screws. Sliding of the rubber on the seating surfaces to compress the rubber will not be allowed. The design shall be such that compression-set of the rubber shall not affect the ability of the valve to seal when pressure is applied to either side of the gate. The sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

    c. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of 4 mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to AWWA C550, latest revision.

    d. Gate valves 4 through 12-inches shall be manufactured by American-Darling, Mueller or M & H Valve.

a. Check Valves

1. Check valves shall be iron body, bronze mounted. They shall be outside weight and lever type (unless specified otherwise by the ENGINEER or indicated as such on the Plans) with bronze seat, hinge and guide busting. Unless otherwise indicated, check valves for interior use shall be flanged and those for exterior use shall be mechanical joint.

b. Blowoff Assemblies

1. Blowoff assemblies shall be installed in accordance with the details and Specifications at the locations shown on the Plans or as directed by the ENGINEER for the purpose of removing any obstacles or impurities from the main. The piping shall be the size indicated on the Plans PVC with a standard gate valve sized as indicated and 2-piece cast iron valve box and lid marked "Water". The lid shall be secured with a pentagon lock nut.

2.3 FIRE HYDRANTS (FH)

A. All fire hydrants shall conform to the requirements of AWWA C502 for 250 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall not be less than [5-1/4-inches]**.**

B. In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.

C. The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.

D. Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.

E. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.

F. The operating nut shall match those on the existing hydrants. The operating threads shall be totally enclosed in an operating chamber, separated from the hydrant barrel by a rubber O-ring stem seal and lubricated by a grease or an oil reservoir.

G. Hydrant shall be a non-freezing design and be provided with a simple, positive, and automatic drain which shall be fully closed whenever the main valve is opened.

H. Hose and pumper connections shall be breech-locked, pinned, or threaded and pinned to seal them into the hydrant barrel. Each hydrant shall have two 2-1/2-inch hose connections and one 4-1/2-inch pumper connection, all with National Standard threads and each equipped with cap and non-kinking chain.

I. Hydrants shall be furnished with a mechanical joint connection to the spigot of the 6-inch hydrant lead.

J. Minimum depth of bury shall be 4.5 feet. Provide extension section where necessary for proper vertical installation and in accordance with manufacturer's recommendations.

K. All outside surfaces of the barrel above grade shall be painted with enamel equal to Koppers Glamortex 501 in a color to be selected by the Owner.

L. Hydrants shall be traffic model and shall be American or approved equal.

2.4 VALVE BOXES (VB) AND EXTENSION STEMS

A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two-piece screw type with drop covers. Valve boxes shall have a 5.25-inch inside diameter. Valve box covers shall weigh a minimum of 13 pounds. The valve boxes shall be adjustable to 6-inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States.

B. All valves shall be furnished with extension stems, as necessary, to bring the operating nut to within 30-inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801.

C. All Valve Boxes shall be installed with Concrete Collars as Indicated on the Detail Sheet.

2.5 VALVE MARKERS (VM)

A. The CONTRACTOR shall provide a concrete valve marker as detailed on the Drawings for each valve installed. Valve markers shall be stamped "Water".

2.6 TAPPING SLEEVES AND VALVES (TS&V)

A. Tapping sleeves shall be stainless steel of the split-sleeve, mechanical joint type. The CONTRACTOR shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve and valve shall be supplied by the valve manufacturer. Tapping sleeves shall be equal to American-Darling, Mueller or M & H Valve.

2.7 TAPPING SADDLES

A. Tapping saddles shall be brass body type with O-ring gasket. Tapping saddles shall be equal to Mueller Series H-134 Service Clamp.

2.8 CORPORATION COCKS AND CURB STOPS

A. Corporation cocks and curb stops shall be ground key type, shall be made of bronze conforming to ASTM B 61 or B 62, and shall be suitable for the working pressure of the system. Ends shall be suitable for flared tube compression type joint. Threaded ends for inlet and outlet of corporation cocks shall conform to AWWA C800; coupling nut for connection to flared copper tubing shall conform to ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Ford or approved equal.

2.9 AIR VALVES

A. Air Release Valves: Air release valves shall be one of the following types:

1. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float. When the air valve body fills with air, the float falls freely from the orifice to allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up to seat against the orifice and prevent water from being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). A synthetic orifice button shall be affixed to the valve cover to provide a non-corrosive seat for the float. The float shall be constructed of stainless steel. A resilient, Buna-N seat shall be attached to the float for drop-tight closure. The float shall be free floating within the valve body. Valve orifice size shall be as shown on the Drawings.
2. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float and lever mechanism. When the air valve body fills with air, the float falls. Through the leverage mechanism, this causes the resilient seat to open the orifice and allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up. Through the leverage mechanism, this will cause the resilient seat to close the orifice, preventing water from

being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). The float shall be constructed of stainless steel and attached to a stainless steel lever mechanism. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Valve orifice size shall be as shown on the Drawings.

B. Air/Vacuum Valve: The air/vacuum valve shall discharge large amounts of air as the pipeline fills and allow air to enter the pipeline as it drains or in the event of vacuum conditions. The valve shall operate by means of a non-collapsible stainless-steel float which seals an orifice. As air enters the valve the float shall drop from the orifice and allow the air to escape. As water rises in the valve, the float will again seal the orifice. The valve will be of such design that the float cannot blow shut at any air velocity. All working parts shall be of stainless steel. The inside of the valve body shall be epoxy coated. Valve inlet size shall be as shown on the Drawings.

C. Combination Air Valves: Combination air valves shall combine the features of an air release valve and an air/vacuum valve and shall be of one of the following types:

1. Valve shall consist of an air/vacuum valve described in paragraph B. above, with an air release valve described in A. above tapped into its body. The valve shall be of two-piece body design with an isolation gate valve separating the two valves.
2. Valve shall be single body, double orifice, allowing large volumes of air to escape out the larger diameter air and vacuum orifice when filling a pipeline and closes watertight when the liquid enters the valve. During large orifice closure, the smaller diameter air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice. The large air/vacuum orifice shall also allow large volumes of air to enter through the orifice during pipeline drainage to break the vacuum. The Buna-N seats must be fastened to the valve, without distortion, for drop-tight shut-off. The float shall be stainless steel. Valve sizes shall be as shown on the Drawings.

D. Surge Check Valve: Where shown on the Drawings or specified, provide a surge check valve on the inlet of the air/vacuum valve. The surge check valve shall be normally open, spring loaded valve consisting of a body, seat and plug bolted to the inlet of the air/vacuum valve. The surge check shall operate on the interphase between the kinetic energy and relative velocity flows of air and water, allowing air to pass through but water shall close the surge check, reducing the rate of water flow by means of throttling orifices in the plug to prevent shock closure of the air/vacuum valve. The surge check orifices must be an adjustable type to suit operating conditions in the field.

E. All air valves and accessories shall be supplied by a single manufacturer and shall be G.A. Industries, APCO, Crispin or Val-Matic.

2.10 METER SETTERS

A. The meter setter shall be a tandem coppersetter as shown on the standard detail drawings with 3/4" double purpose ends and be 15" high with padlock wing. It shall be all purpose, designed for 5/8" x 3/4" meter and be of sufficient height to raise meters above the bottom of the meter box. The meter setter shall be Ford, or equal. Meter setters shall have an inverted key inlet valve.

B. Setters shall be installed so that the meters are centered in the meter box.

C. The water service line shall be extended a minimum of 18" beyond the meter box on the customer end. The end of the extension shall be capped or plugged to prevent entry of foreign material until the connection is made.

2.11 WATER METERS

A. Water meter shall be cold water displacement type meeting all requirement of AWWA C700-77. The meter sizes shall be 5/8-inch x 3/4-inch meters for 3/4" service rated at a flow of 20 gpm and 1" meters for 1" service rated at a flow of 50 gpm. Meters shall be of frost-proof design and be rotating disk type. The meters shall be equipped with a straight-reading register recording in U.S. Gallons hermetically sealed to prevent fogging and with a removable corrosion resistant strainer screen between the outer case and measuring chamber. Register shall be equipped with a device to afford capability for accurately testing each meter according to AWWA Standards. The body case shall have the manufacturer's serial number imprinted thereon and have raised markings to indicate the direction of flow. Meter shall be Zenner or approved equal.

2.12 YARD HYDRANTS

A. Yard hydrants shall be installed where described on the Drawings or directed by the Engineer in accordance with the details shown. Hydrants shall be of the frost proof, compression type with all working parts removable without digging up the hydrants. Hydrants shall be equipped with removable handwheel or lever, hose connections (1-1/2" size) and bottom connection for 2-inch water line. Hydrants shall be American-Darling or equal.

B. All hydrants shall be backfilled to the ground surface with crushed stone.

C. Exposed portions of hydrants shall be factory painted with an enamel finish. Color charts shall be furnished with Shop Drawings for color selection by the Engineer. Below ground portions shall have two (2) coats of Fed. Spec. TT-V-51F Asphalt Varnish.

2.13 VALVE KEYS

A. The CONTRACTOR shall provide to the OWNER one valve key for every five valves provided, but no more than three and not less than one valve key. Valve keys shall be 72-inches long with a tee handle and a 2-inch square wrench nut. Valve keys shall be furnished by the valve manufacturer. Valve keys shall be equal to Mueller A-24610 or ACIPCO No. 1303.

2.14 CONCRETE

A. Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. For job mixed concrete, submit the concrete mix design for approval by the Engineer. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.15 LINESTOP

A. Line stop valves shall be furnished and installed for isolating sections of existing water line. After installation of the temporary valve, the contractor shall perform pressure testing to ensure the valve maintains working pressure in the line.

PART 3 EXECUTION

3.1 EXISTING UTILITIES AND OBSTRUCTIONS

A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the OWNER. The CONTRACTOR shall call the agencies or departments that own and/or operate utilities in the vicinity of the construction work site at least 72 hours (three business days) prior to construction to verify the location of the existing utilities.

B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.

1. Provide the required notice to the utility owners and allow them to locate their facilities. Field utility locations are valid for only 10 days after original notice. The CONTRACTOR shall ensure, at the time of any excavation, that a valid utility location exists at the point of excavation.
2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.

3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.
4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The CONTRACTOR shall provide the ENGINEER an updated copy of the log bi-weekly, or more frequently if required.

C. Conflict with Existing Utilities

1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tieing-back, supporting, or temporarily suspending service of the parallel or crossing facility. The CONTRACTOR may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the ENGINEER or OWNER. Where such relocation of the water main is denied by the ENGINEER or OWNER, the CONTRACTOR shall arrange to have the utility, main, or service relocated.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The CONTRACTOR may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the ENGINEER or OWNER. Where such relocation of the water main is denied by the ENGINEER or OWNER, the CONTRACTOR shall arrange to have the utility, main, or service relocated.

D. Electronic Locator: Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10-foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10-foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches.

2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 12-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

3.2 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS

A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Department of Transportation, Pulaski County and the City of Burnside with reference to construction operations, safety, traffic control, road maintenance and repair.

B. Traffic Control

1. The CONTRACTOR shall provide, erect and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
2. Construction traffic control devices and their installation shall be in accordance with the current Manual on Uniform Traffic Control Devices for Streets and Highways and the Department of Highways Specifications, latest edition.
3. Placement and removal of construction traffic control devices shall be coordinated with the Department of Transportation, Pulaski County, and the City of Burnside a minimum of 48 hours in advance of the activity.
4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead", shall be removed and replaced when needed.
5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.
6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime

operation. Traffic control devices affected by the construction work zone shall be inspected daily.

7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Department of Transportation, Pulaski County, and the City of Burnside. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual on Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to ensure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.
3. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.
5. Construction operations shall be limited to 400 feet along areas within KYDOT jurisdiction, including clean-up and utility exploration.

D. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.

E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

1. The CONTRACTOR shall make provisions for handling all flows in existing creeks, ditches, sewers and trenches by pipes, flumes or other approved methods at all times when his operations would, in any way, interfere with the natural functioning of said creeks, ditches, sewers and drains. The CONTRACTOR shall at all times during construction provide and maintain sufficient equipment for the disposal of all water which enters the

excavation, both in open cut trenches and in tunnels, to render such excavation firm and dry, until the structures to be built thereon are completed.

F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The CONTRACTOR shall take extreme care in moving landscape features and promptly re-establishing these features.

G. Maintaining Highways, Streets, Roadways and Driveways

1. Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work. All excavation shall be conducted in a manner to the last interruption to traffic.
2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.
4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the Work. Driveways and other private and public access routes shall not be kept blocked or closed by the CONTRACTOR for more than a reasonable period of time without prior written approval from the property owner or controlling authority.
5. Maintenance of all traffic shall be in accordance with any requirements of the local road department(s) and/or the Kentucky Department of Transportation. It is the responsibility of the CONTRACTOR to coordinate all work with and notify the above-named agencies, and to provide all necessary signs, barricades, lights, flagmen, and other items for maintenance of traffic.
6. Public travel shall be maintained, unrestricted, wherever and whenever possible. Detours shall be provided when so directed by the appropriate agency. Adequate precautions shall be taken to provide for the safety of both vehicular and pedestrian traffic. Emergency vehicles shall be provided access to construction area at all times.
7. Unless specifically directed otherwise by the ENGINEER, not more than five hundred (500') feet of trench shall be opened ahead of the pipe laying, and not more than five hundred (500') feet of open ditch shall be left behind

the pipe laying. All barricades, lanterns, watchmen, and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the CONTRACTOR.

8. When so required, or when directed by the ENGINEER, only one-half (1/2) of the street crossing and road crossings shall be excavated before placing temporary bridges over the side excavated for the convenience of the traveling public.
9. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridges at the direction of the ENGINEER. Excavated materials shall be disposed of so as to cause the least interference, and in every case the deposition of excavated materials shall be satisfactory to the ENGINEER.

H. Property Protection

1. Extreme care shall be taken to protect trees, fences, poles, crops and all other property from damage unless their removal is authorized by the ENGINEER. Any damaged property shall be restored to as good or better than original condition and shall meet with the approval of the ENGINEER and OWNER.
2. The CONTRACTOR has the right to fully utilize the easement unless specifically stated otherwise on the plans or by the ENGINEER. If any irreplaceable trees, fences, poles or crops, such as tobacco, corn, soy beans and such (excluding pasture land), occur on the easement the CONTRACTOR shall obtain the ENGINEER's and OWNER's approval prior to removing or otherwise causing damage to any of these items.
3. Beyond the limits of the easement the CONTRACTOR shall be responsible for any damage caused by his operations and/or his personnel.

3.3 PIPE DISTRIBUTION

A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.

B. No pipe shall be strung further along the route than 1000 feet beyond the area in which the CONTRACTOR is actually working without written permission from the OWNER.

C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The CONTRACTOR shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.

D. No distributed pipe shall be placed inside drainage ditches.

E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.4 LOCATION AND GRADE

A. The Drawings show the alignment of the water main and the location of valves, hydrants and other appurtenances.

B. Construction Staking

1. The base lines for locating the principal components of the work and bench marks adjacent to the work are shown on the Drawings if available. Base lines shall be defined as the line to which the location of the water main is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line. The CONTRACTOR shall be responsible for performing all survey work required for constructing the water main, including the establishment of base lines and any detail surveys needed for construction. This work shall include the staking out of permanent and temporary easements to insure that the CONTRACTOR is not deviating from the designated easements.
2. The level of detail of survey required shall be that which the correct location of the water main can be established for construction and verified by the ENGINEER or OWNER. Where the location of components of the water main, e.g. tunnels and fittings, are not dimensioned, the establishment on the location of these components shall be based upon scaling these locations from the Drawings with relation to readily identifiable land marks, e.g., survey reference points, power poles, manholes, etc.

C. Reference Points

1. The CONTRACTOR shall take all precautions necessary, which includes, but is not necessarily limited to, installing reference points, in order to protect and preserve the centerline or baseline established by the ENGINEER.
2. Reference points shall be placed, at or no more than three feet, from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the ENGINEER and OWNER for use, prior to verifying reference point locations. Distances between reference points and the manhole centerlines shall be accurately measured to 0.01 foot.
3. The CONTRACTOR shall give the ENGINEER reasonable notice that reference points are set. The reference point locations must be verified by the ENGINEER prior to commencing clearing and grubbing operations.

D. After the CONTRACTOR locates and marks the water main centerline or baseline, the CONTRACTOR shall perform clearing and grubbing.

E. Construction shall begin at a connection location and proceed without interruption. Multiple construction sites shall not be permitted without written authorization from the ENGINEER for each site.

F. The CONTRACTOR shall be responsible for any damage done to reference points, base lines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, base lines, center lines and temporary bench marks as a result of the operations.

3.5 LAYING AND JOINTING PIPE AND ACCESSORIES

A. Lay all pipe and fittings to accurately conform to the lines and grades established by the ENGINEER.

B. Pipe Installation

1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
2. All pipe, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the ENGINEER, who may prescribe corrective repairs or reject the materials.
3. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
6. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.

7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.
8. Detection tape shall be buried 4 to 10-inches deep. Should detection tape need to be installed deeper, the CONTRACTOR shall provide 3-inch wide tape. In no case shall detection tape be buried greater than 20-inches from the finish grade surface.

C. Alignment and Gradient

1. Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.
2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.

D. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the ENGINEER.

E. Joint Assembly

1. Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.
2. The CONTRACTOR shall inspect each pipe joint within 200 feet on either side of main line valves to ensure 100 percent seating of the pipe spigot, except as noted otherwise.
3. Each restrained joint shall be inspected by the CONTRACTOR to ensure that it has been "homed" 100 percent.
4. The CONTRACTOR shall internally inspect each pipe joint to ensure proper assembly for pipe 24-inches in diameter and larger after the pipe has been brought to final alignment.

F. Cutting Pipe: Cut ductile iron pipe using an abrasive wheel saw. Cut PVC pipe using a suitable saw; remove all burrs and smooth the end before jointing. The CONTRACTOR shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.

G. Polyethylene Encasement: Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape

and all damaged areas shall be completely repaired to the satisfaction of the Engineer.

H. Valve and Fitting Installation

1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected or held for inspection by the ENGINEER. Valves shall be closed before being installed.
2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.
3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 30-inches beneath finished grade so as to set the top of the operating nut 30-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the ENGINEER.
4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.
5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Drawings or directed by the ENGINEER, valve markers shall be installed 6-inches inside the right-of-way or easement.

I. Hydrant Installation

1. Prior to installation, inspect all hydrants for direction of opening, nozzle threading, operating nut and cap nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or held for inspection by the ENGINEER.
2. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the roadway, with pumper nozzle facing the roadway,

except that hydrants having two-hose nozzles 90 degrees apart shall be set with each nozzle facing the roadway at an angle of 45 degrees.

3. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle at least 12-inches above the ground or as directed by the ENGINEER.
4. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6-inches above the drain port opening in the hydrant to a distance of 12-inches around the elbow.
5. When a hydrant is set in clay or other impervious soil, a drainage pit 2 x 2 x 2 feet shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant and to a level of 6-inches above the drain port.
6. Hydrants shall be located as shown on the Drawings or as directed by the ENGINEER. In the case of hydrants that are intended to fail at the ground-line joint upon vehicle impact, specific care must be taken to provide adequate soil resistance to avoid transmitting shock moment to the lower barrel and inlet connection. In loose or poor load bearing soil, this may be accomplished by pouring a concrete collar approximately 6-inches thick to a diameter of 24-inches at or near the ground line around the hydrant barrel.

3.6 CONNECTIONS TO WATER MAINS

A. Make connections to existing pipe lines with tapping sleeves and valves, unless specifically shown otherwise on the Drawings.

B. Location: Before laying pipe, locate the points of connection to existing water mains and uncover as necessary for the ENGINEER or OWNER to confirm the nature of the connection to be made.

C. Interruption of Services: Make connections to existing water mains only when system operations permit. Operate existing valves only with the specific authorization and direct supervision of the Owner.

D. Tapping Saddles and Tapping Sleeves

1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
2. Prior to attaching the saddle or sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
3. Before performing field machine cut, the watertightness of the saddle or sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached, which will induce

a test pressure as specified in this Section. No leakage shall be permitted for a period of five minutes.

4. After attaching the saddle or sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one percent hypochlorite solution.

E. Connections Using Solid Sleeves: Where connections are shown on the Drawings using solid sleeves, the CONTRACTOR shall furnish materials and labor necessary to make the connection to the existing pipe line.

F. Connections Using Couplings: Where connections are shown on the Drawings using couplings, the CONTRACTOR shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging and backfill.

3.7 VALVE BOX ADJUSTMENT (Not Used)

3.8 THRUST RESTRAINT

A. Provide restraint at all points where hydraulic thrust may develop.

B. Concrete Blocking

1. Provide concrete blocking for all bends, tees, valves, and other points where thrust may develop, except where other exclusive means of thrust restraint are specifically shown on the Drawings.
2. Concrete shall be as specified in this Section.
3. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the ENGINEER. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.

3.9 INSPECTION AND TESTING

A. Pressure and Leakage Test

1. All sections of the water main subject to internal pressure shall be pressure tested in accordance with AWWA C600. A section of main will be considered ready for testing after completion of all thrust restraint and backfilling.
2. Each segment of water main between main valves shall be tested individually. At no time shall the segment being tested exceed 3,500 feet without prior approval of the ENGINEER.
3. Test Preparation

a. For water mains less than 24-inches in diameter, flush sections thoroughly at flow velocities, greater than 2.5 feet per second, adequate to remove debris from pipe and valve seats. For water mains 24-inches in diameter and larger, the main shall be carefully swept clean, and mopped if directed by the ENGINEER. Partially open valves to allow the water to flush the valve seat.
b. Partially operate valves and hydrants to clean out seats.
c. Provide temporary blocking, bulkheads, flanges and plugs as necessary, to assure all new pipe, valves and appurtenances will be pressure tested.
d. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. Insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as detailed on the Drawings with a meter box.
e. Fill pipeline slowly with water. Provide a suitable pump with an accurate water meter to pump the line to the specified pressure.
f. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure. Where necessary, provide temporary backpressure to meet the differential pressure restrictions.
g. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.

4. Test Pressure: Test the pipeline at 50 psi above the rated working pressure of the pipe, measured at the lowest point, for at least two hours. Maintain the test pressure within 5 psi of the specified test pressure for the test duration. Should the pressure drop more than 5 psi at any time during the test period, the pressure shall be restored to the specified test pressure. Provide an accurate pressure gage with graduation not greater than 5 psi.

5. Leakage

a. Leakage shall be defined as the sum of the quantity of water that must be pumped into the test section, to maintain pressure within 5 psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test. Leakage shall be the total cumulative amount measured on a water meter.
b. The OWNER assumes no responsibility for leakage occurring through existing valves.

6. Test Results:

a. No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{133{,}200}$$

Where: L = allowable leakage, in gallons per hour
S= length of pipe tested, in feet
D= nominal diameter of the pipe, in inches
P= average test pressure during the leakage test, in pounds per square inch (gauge)

As determined under Section 4 of AWWA C600.

b. If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results.

7. Completion: After a pipeline section has been accepted, relieve test pressure. Record type, size and location of all outlets on record drawings.

3.10 DISINFECTING PIPELINE

A. After successfully pressure testing each pipeline section, disinfect in accordance with AWWA C651 for the continuous-feed method and these Specifications.

B. Specialty Contractor: Disinfection shall be performed by an approved specialty contractor. Before disinfection is performed, the CONTRACTOR shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water.

C. Chlorination

1. Apply chlorine solution to achieve a concentration of at least 50 milligrams per liter free chlorine in new line. Retain chlorinated water for 24 hours.
2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the 24 hour period.
3. After 24 hours, all samples of water shall contain at least 25 milligrams per liter free chlorine. Re-chlorinate if required results are not obtained on all samples.

D. Disposal of Chlorinated Water: Reduce chlorine residual of disinfection water to less than one milligram per liter if discharged directly to a body of water or to less than two milligrams per liter if discharged onto the ground prior to disposal. Treat

water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. Flush all lines until residual is equal to existing system.

E. Bacteriological Testing: After final flushing and before the main is placed into service, the CONTRACTOR shall assist the OWNER in collecting samples from the line to have tested for bacteriological quality. Testing shall be performed by the OWNER at a laboratory certified by the State of Kentucky. Re-chlorinate lines until the required results are obtained.

3.11 PROTECTION AND RESTORATION OF WORK AREA

A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.

1. The CONTRACTOR shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
4. The Department of Transportation's engineer shall be authorized to stop all work by the CONTRACTOR when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.

B. Man-Made Improvements: Protect, or remove and replace with the ENGINEER’S approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the Work.

C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the ENGINEER. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to

allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the CONTRACTOR. No stumps, wood piles, or trash piles will be permitted on the work site.

E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate county, state and federal regulatory agencies.

END OF SECTION

PART II

SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2019* and *Standard Drawings, Edition of 2020.*

SUPPLEMENTAL SPECIFICATIONS

The contractor shall use the Supplemental Specifications that are effective at the time of letting. The Supplemental Specifications can be found at the following link:

http://transportation.ky.gov/Construction/Pages/Kentucky-Standard-Specifications.aspx

SPECIAL NOTE FOR BARCODE LABEL ON PERMANENT SIGNS

1.0 DESCRIPTION. Install barcode label on sheeting signs. Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, current edition.

2.0 MATERIALS. The Department will provide the Contractor with a 2 inch x 1 inch foil barcode label for each permanent sheeting sign. A unique number will be assigned to each barcode label.

The Contractor shall contact the Operations and Pavement Management Branch in the Division of Maintenance at (502) 564-4556 to obtain the barcode labels.

3.0 CONSTRUCTION. Apply foil barcode label in the lower right quadrant of the sign back. Signs where the bottom edge is not parallel to the ground, the lowest corner of the sign shall serve as the location to place the barcode label. The barcode label shall be placed no less than one-inch and no more than three inches from any edge of the sign. The barcode must be placed so that the sign post does not cover the barcode label.

Barcodes shall be applied in an indoor setting with a minimum air temperature of 50°F or higher. Prior to application of the barcode label, the back of the sign must be clean and free of dust, oil, etc. If the sign is not clean, an alcohol swab shall be used to clean the area. The area must be allowed to dry prior to placement of the barcode label.

Data for each sign shall include the barcode number, MUTCD reference number, sheeting manufacturer, sheeting type, manufacture date, color of primary reflective surface, installation date, latitude and longitude using the North American Datum of 1983 (NAD83) or the State Plane Coordinates using an x and y ordinate of the installed location.

Data should be provided electronically on the TC 71-229 Sign Details Information and TC 71-230 Sign Assembly Information forms. The Contractor may choose to present the data in a different format provided that the information submitted to the Department is equivalent to the information required on the Department TC forms. The forms must be submitted in electronic format regardless of which type of form is used. The Department will not accept PDF or handwritten forms. These completed forms must be submitted to the Department prior to final inspection of the signs. The Department will not issue formal acceptance for the project until the TC 71-229 and TC-230 electronic forms are completed for all signs and sign assemblies on the project.

4.0 MEASUREMENT. The Department will measure all work required for the installation of the barcode label and all work associated with completion and submission of the sign inventory data (TC 71-229 and TC 71-230).

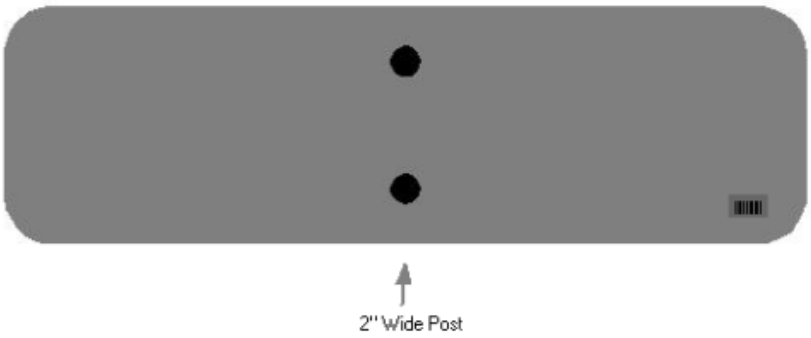
The installation of the permanent sign will be measured in accordance to Section 715.

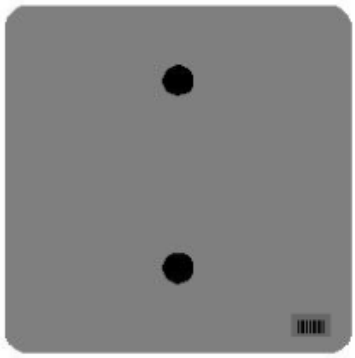
5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24631EC	Barcode Sign Inventory	Each

The Department will not make payment for this item until all barcodes are installed and sign inventory is complete on every permanent sign installed on the project. The Department will make payment for installation of the permanent sign in accordance to Section 715. The Department will consider payment as full compensation for all work required under this special note.

One Sign Post





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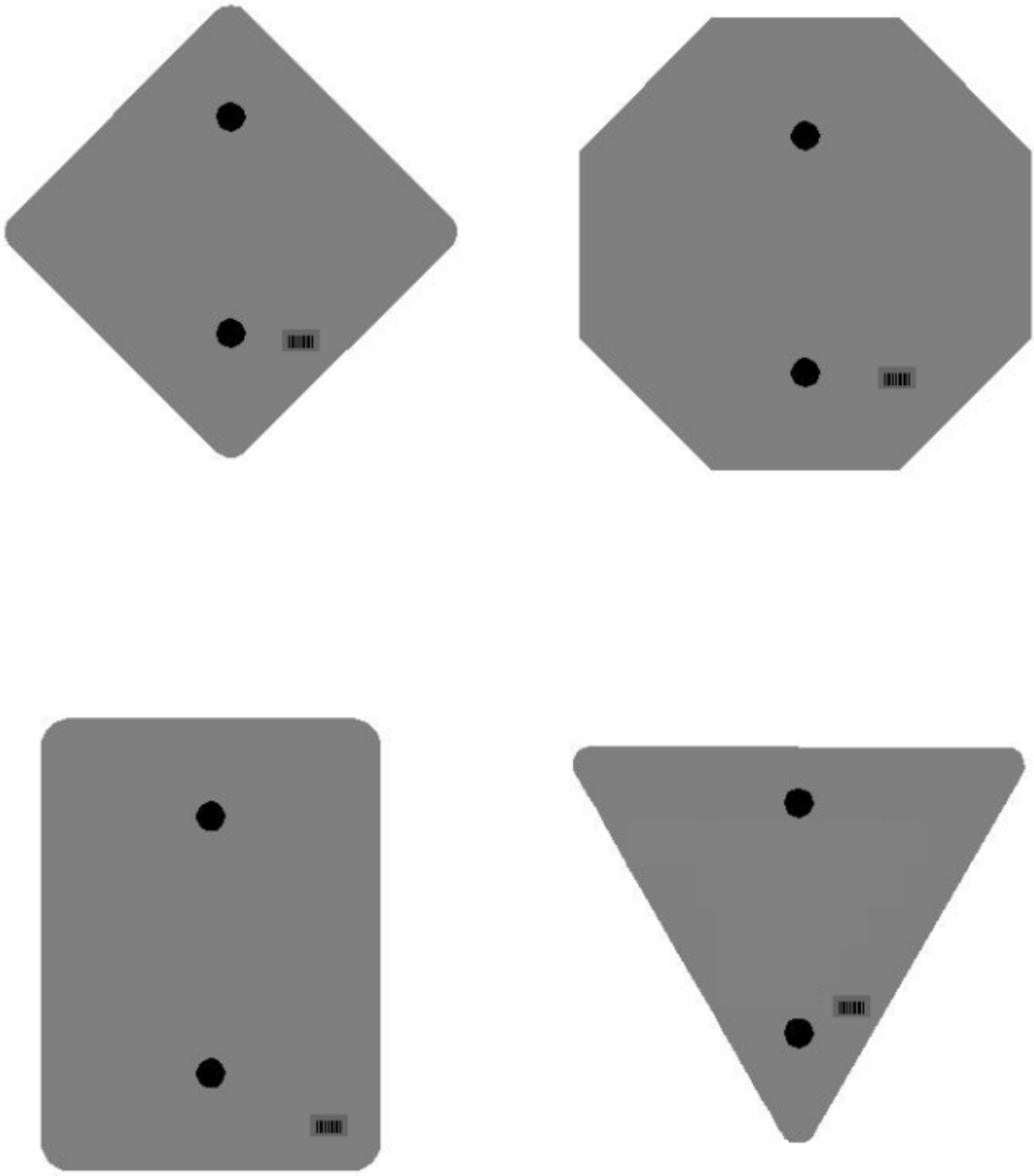

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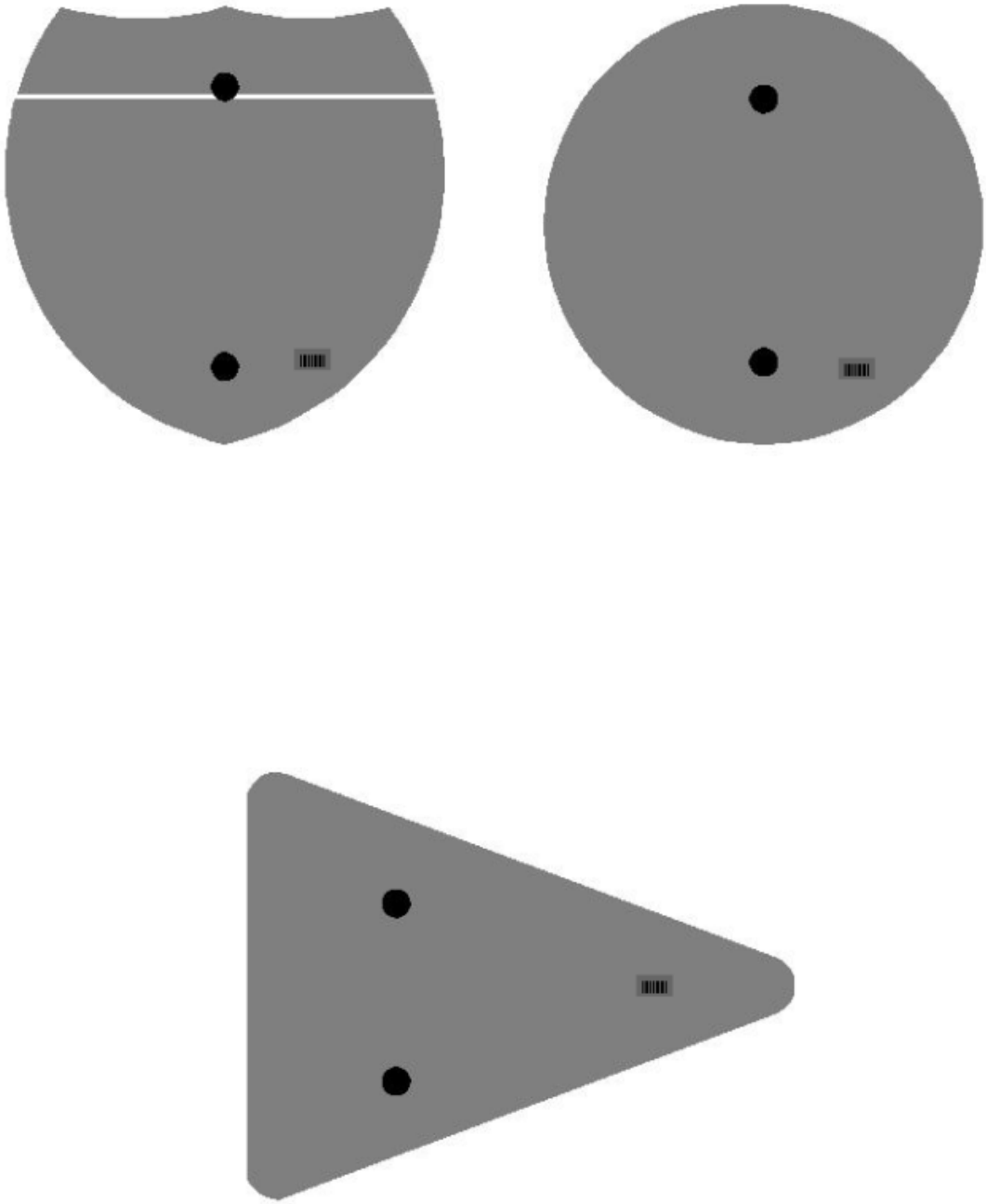
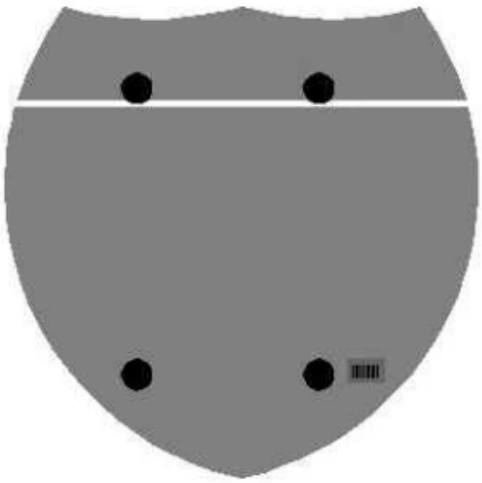
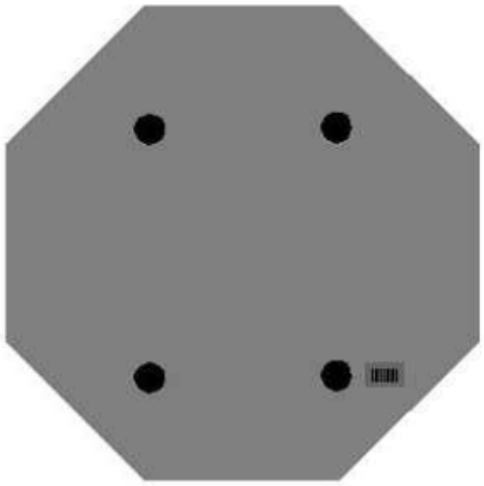


Double Sign Post

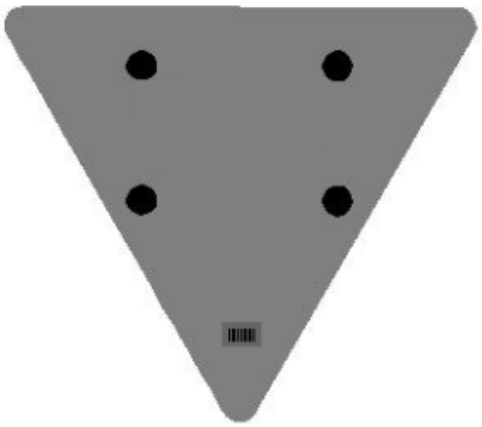


Interstate
Shield



48" Stop

2 Post Signs



PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

LABOR AND WAGE REQUIREMENTS
APPLICABLE TO OTHER THAN FEDERAL-AID SYSTEM PROJECTS

I. APPLICATION

1. These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work or by subcontract. The contractor's organization shall be construed to include only workmen employed and paid directly by the contractor and equipment owned or rented by him, with or without operators.

2. The contractor shall insert in each of his subcontracts all of the stipulations contained in these Required Provisions and such other stipulations as may be required.

3. A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

II. NONDISCRIMINATION OF EMPLOYEES

AN ACT OF THE KENTUCKY
GENERAL ASSEMBLY TO PREVENT
DISCRIMINATION IN EMPLOYMENT
KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (forty and above); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age forty (40) and over. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, except that such a notice or advertisement may indicate a preference, limitation, or specification based on religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, when religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, is a bona fide occupational qualification for employment.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual because of his race, color, religion, national origin, sex, disability or age forty (40) and over, in admission to, or employment in any program established to provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administrating agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

Revised: January 25, 2017

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (7) provides:

No present or former public servant shall, within six (6) months following termination of his office or employment, accept employment, compensation, or other economic benefit from any person or business that contracts or does business with, or is regulated by, the state in matters in which he was directly involved during the last thirty-six (36) months of his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, or for which he received, prior to his state employment, a professional degree or license, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved during the last thirty-six (36) months of his tenure in state government. This subsection shall not prohibit the performance of ministerial functions, including but not limited to filing tax returns, filing applications for permits or licenses, or filing incorporation papers, nor shall it prohibit the former officer or public servant from receiving public funds disbursed through entitlement programs.

KRS 11A.040 (9) states:

A former public servant shall not represent a person or business before a state agency in a matter in which the former public servant was directly involved during the last thirty-six (36) months of his tenure, for a period of one (1) year after the latter of:

a) The date of leaving office or termination of employment; or
b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, 1025 Capital Center Drive, Suite 104, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Revised: May 23, 2022

Kentucky Equal Employment Opportunity Act of 1978

The requirements of the Kentucky Equal Employment Opportunity Act of 1978 (KRS 45.560-45.640) shall apply to this Contract. The apparent low Bidder will be required to submit EEO forms to the Division of Construction Procurement, which will then forward to the Finance and Administration Cabinet for review and approval. No award will become effective until all forms are submitted and EEO/CC has certified compliance. The required EEO forms are as follows:

- EEO-1: Employer Information Report
- Affidavit of Intent to Comply
- Employee Data Sheet
- Subcontractor Report

These forms are available on the Finance and Administration's web page under ***Vendor Information, Standard Attachments and General Terms*** at the following address: **https://www.eProcurement.ky.gov**.

Bidders currently certified as being in compliance by the Finance and Administration Cabinet may submit a copy of their approval letter in lieu of the referenced EEO forms.

For questions or assistance please contact the Finance and Administration Cabinet by email at **finance.contractcompliance@ky.gov** or by phone at 502-564-2874.

EMPLOYEE RIGHTS
UNDER THE FAIR LABOR STANDARDS ACT

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

FEDERAL MINIMUM WAGE
$7.25 PER HOUR
BEGINNING JULY 24, 2009

OVERTIME PAY

At least 1½ times your regular rate of pay for all hours worked over 40 in a workweek.

CHILD LABOR

An employee must be at least **16** years old to work in most non-farm jobs and at least **18** to work in non-farm jobs declared hazardous by the Secretary of Labor.

Youths **14** and **15** years old may work outside school hours in various non-manufacturing, non-mining, non-hazardous jobs under the following conditions:

No more than

- **3** hours on a school day or **18** hours in a school week;
- **8** hours on a non-school day or **40** hours in a non-school week.

Also, work may not begin before **7 a.m.** or end after **7 p.m.**, except from June 1 through Labor Day, when evening hours are extended to **9 p.m.** Different rules apply in agricultural employment.

TIP CREDIT

Employers of "tipped employees" must pay a cash wage of at least $2.13 per hour if they claim a tip credit against their minimum wage obligation. If an employee's tips combined with the employer's cash wage of at least $2.13 per hour do not equal the minimum hourly wage, the employer must make up the difference. Certain other conditions must also be met.

ENFORCEMENT

The Department of Labor may recover back wages either administratively or through court action, for the employees that have been underpaid in violation of the law. Violations may result in civil or criminal action.

Employers may be assessed civil money penalties of up to $1,100 for each willful or repeated violation of the minimum wage or overtime pay provisions of the law and up to $11,000 for each employee who is the subject of a violation of the Act's child labor provisions. In addition, a civil money penalty of up to $50,000 may be assessed for each child labor violation that causes the death or serious injury of any minor employee, and such assessments may be doubled, up to $100,000, when the violations are determined to be willful or repeated. The law also prohibits discriminating against or discharging workers who file a complaint or participate in any proceeding under the Act.

ADDITIONAL INFORMATION

- Certain occupations and establishments are exempt from the minimum wage and/or overtime pay provisions.
- Special provisions apply to workers in American Samoa and the Commonwealth of the Northern Mariana Islands.
- Some state laws provide greater employee protections; employers must comply with both.
- The law requires employers to display this poster where employees can readily see it.
- Employees under 20 years of age may be paid $4.25 per hour during their first 90 consecutive calendar days of employment with an employer.
- Certain full-time students, student learners, apprentices, and workers with disabilities may be paid less than the minimum wage under special certificates issued by the Department of Labor.

For additional information:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

WHD U.S. Wage and Hour Division

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Wage and Hour Division

WHD Publication 1088 (Revised July 2009)

PART IV

INSURANCE

Refer to
Kentucky Standard Specifications for Road and Bridge Construction,
current edition

PART V

BID ITEMS

231305

PROPOSAL BID ITEMS

Report Date 12/22/22

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	164.00	TON		$	
0020	00190		LEVELING & WEDGING PG64-22	276.00	TON		$	
0030	00221		CL2 ASPH BASE 0.75D PG64-22	130.00	TON		$	
0040	00307		CL2 ASPH SURF 0.38B PG64-22	218.00	TON		$	
0050	00356		ASPHALT MATERIAL FOR TACK	1.11	TON		$	
0060	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		$	
0070	02677		ASPHALT PAVE MILLING & TEXTURING	182.00	TON		$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0080	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	10.00	EACH		$	
0090	02159		TEMP DITCH	315.00	LF		$	
0100	02230		EMBANKMENT IN PLACE	265.00	CUYD		$	
0110	02242		WATER	6.00	MGAL		$	
0120	02351		GUARDRAIL-STEEL W BEAM-S FACE	500.00	LF		$	
0130	02360		GUARDRAIL TERMINAL SECTION NO 1	2.00	EACH		$	
0140	02381		REMOVE GUARDRAIL	487.50	LF		$	
0150	02429		RIGHT-OF-WAY MONUMENT TYPE 1	4.00	EACH		$	
0160	02432		WITNESS POST	4.00	EACH		$	
0170	02545		CLEARING AND GRUBBING (APPROXIMATELY 0.76 ACRES)	1.00	LS		$	
0180	02562		TEMPORARY SIGNS	94.50	SQFT		$	
0190	02585		EDGE KEY	124.50	LF		$	
0200	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		$	
0210	02701		TEMP SILT FENCE	315.00	LF		$	
0220	02703		SILT TRAP TYPE A	1.00	EACH		$	
0230	02704		SILT TRAP TYPE B	1.00	EACH		$	
0240	02706		CLEAN SILT TRAP TYPE A	1.00	EACH		$	
0250	02707		CLEAN SILT TRAP TYPE B	1.00	EACH		$	
0260	02726		STAKING	1.00	LS		$	
0270	05950		EROSION CONTROL BLANKET	336.00	SQYD		$	
0280	05952		TEMP MULCH	2,452.00	SQYD		$	
0290	05953		TEMP SEEDING AND PROTECTION	460.00	SQYD		$	
0300	05963		INITIAL FERTILIZER	.03	TON		$	
0310	05964		MAINTENANCE FERTILIZER	.05	TON		$	
0320	05985		SEEDING AND PROTECTION	690.00	SQYD		$	
0330	05992		AGRICULTURAL LIMESTONE	2.28	TON		$	
0340	06514		PAVE STRIPING-PERM PAINT-4 IN	3,010.00	LF		$	
0350	06574		PAVE MARKING-THERMO CURV ARROW	6.00	EACH		$	
0360	21289ED		LONGITUDINAL EDGE KEY	718.00	LF		$	

Section: 0003 - DRAINAGE

231305

PROPOSAL BID ITEMS

Report Date 12/22/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0370	00466		CULVERT PIPE-30 IN	127.00	LF		$	
0380	01210		PIPE CULVERT HEADWALL-30 IN	1.00	EACH		$	
0390	01452		S & F BOX INLET-OUTLET-30 IN	1.00	EACH		$	

Section: 0004 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0400	06406		SBM ALUM SHEET SIGNS .080 IN	41.00	SQFT		$	
0410	06410		STEEL POST TYPE 1	62.50	LF		$	
0420	24631EC		BARCODE SIGN INVENTORY	5.00	EACH		$	

Section: 0005 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0430	14003		W CAP EXISTING MAIN	3.00	EACH		$	
0440	14007		W ENCASEMENT STEEL BORED RANGE 2	60.00	LF		$	
0450	14019		W FIRE HYDRANT ASSEMBLY	3.00	EACH		$	
0460	14058		W PIPE PVC 04 INCH	10.00	LF		$	
0470	14059		W PIPE PVC 06 INCH	10.00	LF		$	
0480	14060		W PIPE PVC 08 INCH	430.00	LF		$	
0490	14078		W SERV PE/PLST LONG SIDE 1-1/2 IN	1.00	EACH		$	
0500	14089		W TAPPING SLEEVE AND VALVE SIZE 1	1.00	EACH		$	
0510	14106		W VALVE 08 INCH	1.00	EACH		$	
0520	14163		W LINE STOP SIZE 1	3.00	EACH		$	

Section: 0006 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0530	02569		DEMOBILIZATION	1.00	LS		$	