



**CALL NO. 301**

**CONTRACT ID. 151066**

**CAMPBELL COUNTY**

**FED/STATE PROJECT NUMBER FD04 SPP 019 0009 NEW ALIGN**

**DESCRIPTION PATTERSON STREET-MONMOUTH STREET(KY-9)**

**WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE**

**PRIMARY COMPLETION DATE 12/1/2017**

**LETTING DATE: October 23,2015**

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME October 23,2015. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT 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 - 06

**CONTRACT ID - 151066**

**FD04 SPP 019 0009 NEW ALIGN**

**COUNTY - CAMPBELL**

**PCN - DE01900091566**

**FD04 SPP 019 0009 NEW ALIGN**

PATTERSON STREET-MONMOUTH STREET(KY-9) RECONSTRUCT KY-9 ALONG A NEW ROUTE FROM 5TH STREET TO US-27.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 06-08101.20.

GEOGRAPHIC COORDINATES LATITUDE 39:05:28.00 LONGITUDE 84:28:57.00

**COMPLETION DATE(S):**

COMPLETED BY 12/01/2017

APPLIES TO ENTIRE CONTRACT

## **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 Expedite Bidding Program available on the Internet web site of the Department of Highways, Division of Construction Procurement. ([www.transportation.ky.gov/construction-procurement](http://www.transportation.ky.gov/construction-procurement))

The Bidder must download the bid file located on the Bid Express website ([www.bidx.com](http://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 is advised that the Underground Facility Damage Protection Act of 1994, became law January 1, 1995. It is the contractor's responsibility to determine the impact of the act regarding this project, and take all steps necessary to be in compliance with the provision of the act.

### **SPECIAL NOTE FOR COMPOSITE OFFSET BLOCKS**

Contrary to the Standard Drawings (2012 edition) the Cabinet will allow 6" composite offset blocks in lieu of wooden offset blocks, except as specified on proprietary end treatments and crash cushions. The composite blocks shall be selected from the Cabinet's List of Approved Materials.

### **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](mailto: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](http://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. (See attachment)

10/29/12



Steven L. Beshear  
Governor

Commonwealth of Kentucky  
Finance and Administration Cabinet  
**OFFICE OF THE SECRETARY**  
Room 383, Capitol Annex  
702 Capital Avenue  
Frankfort, KY 40601-3462  
(502) 564-4240  
Fax (502) 564-6785

Lori H. Flanery  
Secretary

## SECRETARY'S ORDER 11-004

### FINANCE AND ADMINISTRATION CABINET

#### Vendor Document Disclosure

**WHEREAS**, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary to conduct a review of the records of a private vendor that holds a contract to provide goods and/or services to the Commonwealth; and

**WHEREAS**, in order to promote accountability and transparency in governmental operations, the Finance and Administration Cabinet believes that a mechanism should be created which would provide for review and assistance to an Executive Branch agency if said agency cannot obtain access to documents that it deems necessary during the course of an audit, investigation or any other inquiry by an Executive Branch agency that involves the review of documents; and

**WHEREAS**, KRS 42.014 and KRS 12.270 authorizes the Secretary of the Finance and Administration Cabinet to establish the internal organization and assignment of functions which are not established by statute relating to the Finance and Administration Cabinet; further, KRS Chapter 45A.050 and 45A.230 authorizes the Secretary of the Finance and Administration Cabinet to procure, manage and control all supplies and services that are procured by the Commonwealth and to intervene in controversies among vendors and state agencies; and

**NOW, THEREFORE**, pursuant to the authority vested in me by KRS 42.014, KRS 12.270, KRS 45A.050, and 45A.230, I, Lori H. Flanery, Secretary of the Finance and Administration Cabinet, do hereby order and direct the following:

- I. Upon the request of an Executive Branch agency, the Finance and Administration Cabinet ("FAC") shall formally review any dispute arising where the agency has requested documents from a private vendor that holds a state contract and the vendor has refused access to said documents under a claim that said documents are not directly pertinent or relevant to the agency's inquiry upon which the document request was predicated.
- II. Upon the request of an Executive Branch agency, the FAC shall formally review any situation where the agency has requested documents that the agency deems necessary to

conduct audits, investigations or any other formal inquiry where a dispute has arisen as to what documents are necessary to conclude the inquiry.

- III. Upon receipt of a request by a state agency pursuant to Sections I & II, the FAC shall consider the request from the Executive Branch agency and the position of the vendor or party opposing the disclosure of the documents, applying any and all relevant law to the facts and circumstances of the matter in controversy. After FAC's review is complete, FAC shall issue a Determination which sets out FAC's position as to what documents and/or records, if any, should be disclosed to the requesting agency. The Determination shall be issued within 30 days of receipt of the request from the agency. This time period may be extended for good cause.
- IV. If the Determination concludes that documents are being wrongfully withheld by the private vendor or other party opposing the disclosure from the state agency, the private vendor shall immediately comply with the FAC's Determination. Should the private vendor or other party refuse to comply with FAC's Determination, then the FAC, in concert with the requesting agency, shall effectuate any and all options that it possesses to obtain the documents in question, including, but not limited to, jointly initiating an action in the appropriate court for relief.
- V. Any provisions of any prior Order that conflicts with the provisions of this Order shall be deemed null and void.

**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 Expedite Bidding Program. Submittal of the Affidavit should be done along with the bid in Bid Express.**

03/01/2011

### **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.

### **JPC RIDE QUALITY**

The Department will apply JPC Ride Quality requirements on this project in accordance with Section 501.03.19(B).

### **ASPHALT PAVEMENT RIDE QUALITY CATEGORY B**

The Department will apply Pavement Rideability Requirements on this project in accordance with Section 410, Category B.

### **OPTION A**

Be advised that the Department will accept compaction of asphalt mixtures furnished for driving lanes and ramps, at 1 inch (25mm) or greater, on this project according to OPTION A in accordance with Section 402 and Section 403 of the current Standard Specifications. The Department will require joint cores as described in Section 402.03.02 for surface mixtures only. The Department will accept compaction of all other asphalt mixtures according to OPTION B.

9/22/15

**KY9, Campbell County**  
**Item Number: 6-8101.20**

**SPECIAL NOTE**  
**ALTERNATE PAVEMENT BID ADJUSTMENT**

This project includes alternate bidding for asphalt or concrete pavement. There are specific items listed for each pavement type to be bid with the alternate selected by the Contractor. There is also a line item in the alternate categories for each alternate to adjust for the projected out-year life-cycle costs to the Cabinet. These line item adjustments are as follows:

Asphalt Pavement Adjustment = **\$85,112**

Concrete Pavement Adjustment = **\$55,307**

The amount reflective of the pavement type selected by each contractor will be added to their respective bid for comparison of the low bid. The adjustment *shall be used only for determination of the lowest bidder and shall not be used to determine the final payment* to the contractor when the project is completed.

Please note that these adjustments should not be used for the calculation of the maximum Mobilization amount and are not required to be included in the minimum Demobilization amount.

Proposal Guaranty

As a supplement to Section 102 of the Standard Specifications, it will not be necessary for the Proposal Guaranty to include an amount necessary to cover the amount of the bid adjustment.

**ITEMS FOR INSTALL**

Item Number:	<u>8-8101.20</u>	Project No.	_____
County:	<u>campbell</u>	Project Manager:	_____
Description:	<u>4th at monmouth, 5th at central, 4th at central</u>	Office Charge No.	_____
Fund:	<u>1100</u>	Function:	<u>fd04</u>
Department:	<u>625</u>	Activity:	<u>4260</u>
District:	<u>6</u>	Object Code:	<u>E389</u>
County:	<u>19</u>	Program:	<u>7763501c</u>

**Kerry needs to be notified of any Special Orders**

Cabinets		Master code	Unit Cost	Cost
2	T-01-0020	Base Mounted 332 Cabinet	\$4,497.97	\$8,995.94
2	T-01-0100	170 Controller	\$1,179.38	\$2,358.76
16	T-01-0700	Load Switches	\$15.40	\$246.40
<b>Total</b>				<b>\$11,601.10</b>

Signals		Master code	Unit Cost	Cost
14	T-02-0009	Siemens 3 Section Signal	\$162.00	\$2,268.00
16	T-02-0090	Pedestrian signal housing	\$147.02	\$2,352.32
14	T-02-0330	LED Module 12" red ball	\$21.46	\$300.44
14	T-02-0340	LED Module 12" yellow ball	\$24.72	\$346.03
14	T-02-0350	LED Module 12" green ball	\$23.00	\$322.00
16	T-02-0365	LED Countdown Pedestrian Module	\$97.19	\$1,555.09
<b>Total</b>				<b>\$7,143.89</b>

Special items		Master code	Unit Cost	Cost
2	T-02-0520	Antenna 10 db yagi	\$127.49	\$254.99
2	T-03-0240	Jumper 60' N-N RG-213	\$64.73	\$129.46
1	T-02-0660	Pedstl.top mntg.bkt Two-way	\$133.28	\$133.28
1	T-02-0670	Pedestal	\$287.77	\$287.77
<b>Total</b>				<b>\$805.50</b>

Poles		Master code	Unit Cost	Cost
3	T-04-0010	Steel Strain Pole 28 foot	\$1,778.54	\$5,335.61
1	T-04-0020	Steel Strain Pole 30 foot	\$2,426.96	\$2,426.96
<b>Total</b>				<b>\$7,762.56</b>

**FINAL TOTAL \$27,313.05**

Send copies to:  
[Ted.Swansegar@ky.gov](mailto:Ted.Swansegar@ky.gov)  
[Adam.proctor@ky.gov](mailto:Adam.proctor@ky.gov)

All districts

updated 8/13/2015

**Special Notes:**

Newport on the Levee access can be closed no earlier than September 15<sup>th</sup> and must be open no later than November 15<sup>th</sup> of the same calendar year. The total length of the closure shall be no longer than 6 weeks in duration. The Contractor shall notify Newport Levee's Engineer and Management in writing a minimum of two weeks prior to the closure. A penalty of \$5,000/day will be charged for every day over 6 weeks of closure, or for every day past November 15 that the closure.

Buildings located within the Right of Way on Parcels 115, Victoria Square Apartments, and 116, Kentucky Motor Services, Inc. will not be demolished by the KYTC demolition contractor before May 1, 2016.

## **GENERAL UTILITY COORDINATION**

**Payment under this item is for coordination required and/or delays incurred due to concurrent utility work on the project. This shall include delays incurred due to unforeseen utility repairs not included in the contract plan set and proposal. The contractor shall be responsible for direct coordination with all utility companies involved in the project. Any changes to the proposed scope and/or schedule of the utility work shall be approved by KYTC.**



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

TC 62-226  
Rev. 07/2015  
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**RIGHT OF WAY CERTIFICATION**

ITEM #	COUNTY	PROJECT #	FEDERAL PROJECT #
6-8101.20	Campbell	7763501	NA

PROJECT DESCRIPTION Reconstruct KY-9 from 5<sup>th</sup> Street to US27 (York Street)

**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 with FHWA regulations under the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970, as amended. No additional rights of way or relocation assistance were required for this project.

**ADDITIONAL RIGHT OF WAY REQUIRED AND CLEARED**

TOTAL NUMBER OF PARCELS ON PROJECT	IMPROVEMENTS	
NUMBER OF PARCELS THAT HAVE BEEN ACQUIRED BY:	<input type="checkbox"/>	There were no improvements within the required right of way
Signed Deed	<input type="checkbox"/>	All improvements have been removed from the required right of way
Condemnation	<input type="checkbox"/>	Improvements are currently being removed and it is anticipated that right of way will be cleared prior to the letting date
Signed Right of Entry Agreement	<input type="checkbox"/>	Improvement removal will be included in the construction contract
RELOCATION ASSISTANCE	<input type="checkbox"/>	
Relocation Assistance was not required for this project	<input type="checkbox"/>	
All parties have been relocated in accordance with FHWA regulations	<input type="checkbox"/>	

**ADDITIONAL RIGHT OF WAY REQUIRED WITH EXCEPTION**

TOTAL NUMBER OF PARCELS ON PROJECT	9	
Number of parcels acquired by Deed, Condemnation or Signed Right of Entry Agreement	6	
EXCEPTION(S)	ANTICIPATED DATE OF POSSESSION	IMPROVEMENTS
3	1/15/2016	<input type="checkbox"/> There were no improvements within the required right of way
		<input type="checkbox"/> All improvements have been removed from the required right of way
		<input type="checkbox"/> Improvements are currently being removed and it is anticipated that right of way will be cleared prior to the letting date
		<input type="checkbox"/> Improvement removal will be included in the construction contract

**RELOCATION ASSISTANCE**

Relocation assistance was not required for this project

All parties have been relocated in accordance with FHWA regulations

Notes/Comments: Parcel #113 and Parcel #119 are expected to sign documents the week of 9/21/2015. Parcel #116 is in condemnation and agreement has been reached. Parcel #118 went through mediation and has been resolved. All improvements will be cleared by 5/1/2016. Relocation is expected to be completed by 1/15/2016.

LPA		Right of Way Director	
Printed Name		Printed Name	Janice L. ...
Signature		Signature	<i>[Signature]</i>
Date		Date	9/17/15
Right of Way Supervisor		FHWA	
Printed Name	ERIC J. KINMAN	Printed Name	
Signature	<i>[Signature]</i>	Signature	
Date	9/17/15	Date	

## UTILITIES AND RAIL CERTIFICATION NOTE

**CAMPBELL COUNTY  
FD04 019 77635 01U  
RECONSTRUCT KY 9 ALONG NEW ROUTE  
FROM 5<sup>TH</sup> STREET TO US 27 (YORK STREET)  
ITEM NUMBER 06-8101.20**

### GENERAL PROJECT NOTE ON UTILITY PROTECTION

Utility coordination efforts determined that there is significant utility relocation work required to complete the project. The information provided in this Utilities and Rail Certification Note may not be exact or complete and is provided for the contractor's use in planning the execution of the work. It shall be the road contractor's responsibility to verify the completeness and/or accuracy of all such information being furnished.

#### Flowable Fill Requirement

The road contractor **MUST** use flowable fill as the backfill media any place utility facilities cross under existing or proposed roadway surfaces unless concrete encasement is called for per plan. Compacted earth or flowable fill shall be used in all other ditches within the project limits. It should also be noted that the cost of the flowable fill shall be incidental to the cost of the utility line being installed.

#### Maintenance of Utility Services

All existing utility facilities are to be maintained throughout road construction. Temporary utility services to maintain service are to be provided and paid for by the road contractor as incidental to road construction. No additional compensation will be paid the contractor for temporary work and materials to maintain existing utility services. No unauthorized discharge of sewage due to the road contractor's work will be allowed.

#### Damage to Utilities

**Any intentional or accidental disruption of service due to damage to any utility service mains caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day (\$5,000/day) per occurrence against the contractor until such time as the utility service is restored.**

**Any intentional or accidental disruption of any individual utility service caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five hundred dollars per day (\$500/day) per occurrence against the contractor until such time as service is restored.**

**Liquidated damages shall not be charged in addition for service disruptions when a main disruption is involved.**

## UTILITIES AND RAIL CERTIFICATION NOTE

**CAMPBELL COUNTY  
FD04 019 77635 01U  
RECONSTRUCT KY 9 ALONG NEW ROUTE  
FROM 5<sup>TH</sup> STREET TO US 27 (YORK STREET)  
ITEM NUMBER 06-8101.20**

### Abandoned Utilities

The contractor shall safeload the entire length of all abandoned pipes 6 inches in diameter and larger under proposed pavement and under any existing pavement that is to remain. The contractor shall safeload the entire length of all abandoned pipes 15 inches and larger which will be located outside of proposed pavement but within project limits. Appropriate bid items have been included in the road contract. The safeloading criteria above shall be observed unless otherwise directed by the Resident Engineer or his representative.

### External Utility Permits

The Kentucky Division of Water permits for water relocation and sanitary sewer work were not available before letting. These items will be distributed at the preconstruction meeting.

### Utility Phasing

The contractor should be aware that some phases of the road construction will need to be completed first to accommodate the relocation of utilities and that some utilities will need to be relocated first to accommodate the relocation of others. The contractor should review the plans and draw his own conclusions as to the phasing of the road work and of various utilities. The contractor should pay close attention to the proximity of construction of new facilities when working in the vicinity of existing water mains and sanitary sewers to prevent blow-outs.

**NOTE: DO NOT DISTURB THE FOLLOWING UTILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS**

**Northern Kentucky Water District, Sanitation District No 1, Duke Energy Electric, Duke Energy Gas, Cincinnati Bell Telephone, Level 3 Communications, Windstream Communications and Time Warner Cable** have facilities that require relocation.

*Please see the notes below pertaining to their relocations.*

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

**THE FOLLOWING COMPANIES ARE RELOCATING/ADJUSTING THEIR UTILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION**

N/A

## UTILITIES AND RAIL CERTIFICATION NOTE

**CAMPBELL COUNTY  
FD04 019 77635 01U  
RECONSTRUCT KY 9 ALONG NEW ROUTE  
FROM 5<sup>TH</sup> STREET TO US 27 (YORK STREET)  
ITEM NUMBER 06-8101.20**

**THE FOLLOWING COMPANIES HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE COMPANY OR THE COMPANY'S SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT**

Duke Energy Electric, Cincinnati Bell Telephone, Level 3 Communications, Windstream Communications & Time Warner Cable.

The companies listed above have overhead facilities to relocate to a combination of new poles and a new duct system. Installation of the new poles and some overhead transfers should be completed by January 1, 2016. The remaining overhead and underground relocations will be contingent upon the road contractor completing phases of the utility duct system in conjunction with the KY 9 reconstruction.

The Department will consider submission of a bid as the Contractor's agreement to not make any claims for additional compensation due to delays or other conditions created by the operations of Duke Energy Electric, Cincinnati Bell Telephone, Level 3 Communications, and Windstream Communications & Time Warner Cable. Working days will not be charged for those days on which work on Duke Energy Electric, Cincinnati Bell Telephone, Level 3 Communications, Windstream Communications & Time Warner Cable facilities is delayed, as provided in the current edition of the KY Standard Specifications for Road and Bridge Construction. Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to the project, the KYTC Resident Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor.

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

DUKE ENERGY ELECTRIC, CINCINNATI BELL TELEPHONE, LEVEL 3 COMMUNICATIONS, WINDSTREAM COMMUNICATIONS & TIME WARNER CABLE will require underground utility ducts to be installed by the road contractor before their existing overhead facilities can be relocated to avoid conflicts with road construction.

Plans for the installation of this duct system are shown on the KY 9 Electric Utilities Plan set and included in the roadway plans with specifications in the proposal.

DUKE ENERGY (GAS) facilities shall be relocated by the road contractor as shown on the KY 9 Gas Utilities Plan set included in the roadway plans with specifications inserted in the project proposal. Please note, roadway fill could be required to be in place before installation of these facilities. It will be the contractor's responsibility to coordinate the gas main relocation with Duke Energy Gas Division.

## UTILITIES AND RAIL CERTIFICATION NOTE

**CAMPBELL COUNTY  
FD04 019 77635 01U  
RECONSTRUCT KY 9 ALONG NEW ROUTE  
FROM 5<sup>TH</sup> STREET TO US 27 (YORK STREET)  
ITEM NUMBER 06-8101.20**

Only those contractors preapproved by the gas company and listed at the end of the gas specifications inserted in the proposal can perform gas relocation construction on this project. Contrary to previous project requirements, preapproved gas contractors do not have to be preapproved by KYTC.

Alignment changes to proposed gas facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed gas main alignment changes to the Duke gas inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed gas main alignment.

NORTHERN KENTUCKY WATER DISTRICT facilities are to be relocated by the road contractor as shown on the KY 9 Water Utilities Plan set included in the roadway plans with specifications inserted in the project proposal. Please note, roadway fill could be required to be in place before installation of these facilities.

Any alignment changes to proposed water main facilities to accommodate unforeseen field conditions are possible. However, it is the responsibility of the roadway contractor to communicate any proposed main alignment changes to the utility inspector and the KYTC Resident Engineer or their designated representative prior to actually modifying the proposed main alignment.

SANITATION DISTRICT NO. 1 facilities are to be relocated by the road contractor as shown on the KY 9 Sanitary Sewer Utilities Plan set included in the roadway plans with specifications inserted in the project proposal.

**THE FOLLOWING RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED**

**No Rail Involved**       **Minimal Rail Involved (See Below)**       **Rail Involved (See Below)**

### AREA UTILITIES CONTACT LIST

Utility Company/Agency                      Contact Name                      Contact Information

**CONTACT INFORMATION WILL BE PROVIDED**

**AT THE PRECONSTRUCTION MEETING**

## UTILITIES AND RAIL CERTIFICATION NOTE

**CAMPBELL COUNTY  
FD04 019 77635 01U  
RECONSTRUCT KY 9 ALONG NEW ROUTE  
FROM 5<sup>TH</sup> STREET TO US 27 (YORK STREET)  
ITEM NUMBER 06-8101.20**

### **SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES**

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.

### **BEFORE YOU DIG**

The contractor is instructed to call 1-800-752-6007 to reach KY 811, the one-call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that owners of underground facilities are not required to be members of the KY 811 one-call Before-U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area.

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

# **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 Standard 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. Those utility owners with a prequalification or preapproval requirement are as follows:

(The district utility agent shall list here utility owners requiring prequalified or preapproved contractors to perform work on their facilities. The utility agent shall place appropriate list(s) of prequalified or preapproved contractors at the end of these notes with each list identified with the utility owner name, utility type and appropriate heading at the top. If there are some utility owners that require prequalified or preapproved contractors and others that do not within this same contract, it may be prudent to list here each utility owner with utility work in the road contract and state if they require prequalified or preapproved contractors or not. If no utility owner prequalifies or preapproves contractors, the following statement shall be placed here: **"No contractors are required to be prequalified or preapproved by the utility owner(s) to perform utility relocation work under this contract."**)

The bidding contractor needs to review the above list and look for a list of preapproved or prequalified contractors at the end of these general notes as identified above before bidding. Only contractors shown to be prequalified or preapproved by the utility owner on the following list(s) will be allowed to work on that utility as a part of this contract.

Any utility contractor that is not listed as prequalified or preapproved when the project is advertised for bid and wishes to be added must make request through the KYTC Contract Procurement website. The request should be made at least one week prior to the bidding deadline to allow for review and posting on the KYTC Contract Procurement website. A contractor is only considered prequalified or preapproved when published on the KYTC Contract Procurement website. Contractors that contact the utility owner directly for preapproval or prequalification without contacting KYTC will not be considered for preapproval or prequalification for this contract. Contractors that are not prequalified or preapproved through KYTC before the bidding deadline will not be considered for prequalification or preapproval after bidding.

#### 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 to be 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 to be 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.

### 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.

(USE THE FOLLOWING NOTES ON PROJECTS WHERE THE UTILITY COMPANY IS PROVIDING THE BASE MATERIAL FOR UTILITY RELOCATION-WHERE "INST" ITEMS ARE IN THE CONTRACT)

### MATERIAL

Contrary to Standard 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:

*(List here utility owner name(s) and specific materials that will be provided to the contractor. If there are some utility owners that will be supplying materials and others that will not, it may be prudent to also list each utility owner that will not be supplying materials for clarity of the contract. If no utility owner intends to supply materials, the following statement shall be placed here: "**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.

# Specifications for Gas Main Replacement within STATE OF KENTUCKY ROAD PROJECTS

Revised for:

**KYTC Item 6-8101.20**

**KY 9**

**Duke Energy Job No. 8346362**

**KY 9 North Reconstruction**

September, 2015

## 1.0 GENERAL

### 1.1 Scope of Work

Gas main relocation work required for the proposed KY 9 project consists of the following work:

- Installing approximately 1,340' of 4" and 6" gas main
- Renewing C-M and M-C services as needed
- Completing 6 tie-ins (Tie-ins to be completed or paid for by Duke Energy)

A Gas Contractor, approved by both Duke Energy, shall perform the gas facility relocation work. **The General Contractor, awarded the KYTC road project, shall hire an approved Gas Contractor.** A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

### 1.2 Acceptable Gas Contractors

Installation of gas facilities on this project is limited to the following Gas Contractors due to their pre-qualification for such work with Duke Energy:

1. AMS Construction
2. RLA Investments
3. KS Energy
4. Premier Services

At the end of these specifications is a phone list for the Duke Energy approved Gas Contractors. Contrary to previous road contracts, gas contractors (which are now considered **specialty contractors** by the Kentucky Transportation Cabinet) are no longer required to be prequalified by the Cabinet to perform utility work included in the road contract. All gas contractors prequalified by Duke Energy are now allowed to perform gas work in road contracts. **Department of Transportation regulations prohibit any non-qualified contractor from performing any gas main work. This includes, but is not limited to excavation, main lowering, pipe installation, service installation, and back filling.**

### **1.3 Standards**

In addition to these specifications, all facilities must be installed in accordance with the 2007 Advanced Main Replacement Program (AMRP) Specifications, the Duke Energy's Gas Division Specifications (GD-150 Composite), CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

### **1.4 Definitions**

Where the word "**Engineer**" appears in these specifications or on the gas plans, it shall be understood the "**Engineer**" is the Kentucky Transportation Cabinet (KYTC) Resident Engineer or his/her designated representative and the Duke Energy Engineer or his/her designated representative jointly. Both Engineers must mutually agree upon all decisions made with regard to the gas line construction. The Transportation Cabinet, Resident Engineer shall make all final decisions in all disputes. The Resident Engineer is ultimately responsible for the engineering supervision of the road contract.

Where the word "**Gas Inspector**" or "**Inspector**" appears in these specifications or on the gas plans, it shall be understood the "**Inspector**" is the Duke Energy Gas Inspector or his designated representative.

Where the words "**Resident Engineer**" appears in these specifications or on the gas plans, it shall be understood the "**Resident Engineer**" is the KYTC Resident Engineer or his designated representative.

Where the word "**Road Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Road Contractor**" is the General Contractor that was awarded the road improvement project by KYTC and that hired the Gas Contractor for the gas replacement work.

Where the word "**Gas Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Gas Contractor**" is the Duke Energy and KYTC approved contractor hired by the Road Contractor to perform the gas replacement work within the KYTC Road Project.

### **1.5 Video Taping**

Duke Energy recommends that the Gas Contractor videotape every project prior to starting. The video is extremely important in settling disputes with governing agencies.

### **1.6 Permits & Fees**

All permits for the replacement work will be obtained by Duke Energy, and will be provided to the Gas Contractor by the Gas Inspector prior to the start of work. Duke Energy will pay all permit fees except cut/fill fees. Cut/fill fees required for dumpsites will not be paid by Duke Energy except for material dumped for main tie-ins where the Gas Contractor is paid directly by Duke Energy on a time and material (T&M) basis. The Gas Contractor will be responsible for

all tree damage unless the damage was a result of a direct order by the Engineer. Clean up and restoration on all projects must be in compliance with KYTC and local governmental agencies and must be approved by the Duke Energy Inspector. It is the sole responsibility of the Gas Contractor to check with governing agencies for work hour restrictions. No compensation will be given for restricted work hours or crews working at night.

### **1.7 Training**

Duke Energy will require the Gas Contractor to qualify all necessary personnel on polyethylene fusion and mechanical connections. Duke Energy will provide training to the Gas Contractor on the renewal of services by insertion and mechanical, installation of meter sets, turn off, turn on and appliance light up. Gas Contractors will be trained for free on Duke Energy policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Safety procedures, grounding procedures, and a review for sizing services will also be covered in the training.

### **1.8 Security**

Picture ID's are required for all Gas Contractor employees. Gas Contractor personnel are required to show their ID's whenever asked by customers or Duke Energy Personnel.

## **2.0 MATERIAL**

### **2.1 Duke Energy Supplied Materials**

Duke Energy will provide all:

- Steel and polyethylene pipe,
- Steel and polyethylene pipe fittings, flanges, adapters, couplings, etc.
- Valves and valve assemblies,
- Regulators,
- Regulator vaults or enclosures,
- Cathodic protection material,
- Other associated gas pipe materials required for the replacement work.

#### **2.1.1 Material Delivery and Tracking**

Duke Energy supplied material will be delivered, as the Gas Contractor needs it. Material for the entire project will not be delivered all at once. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material. The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

### **2.2 Contractor Supplied Materials**

The Gas Contractor is required to provide all materials and equipment other than as indicated on the construction drawings that are necessary to construct the project. All welding materials such as welding rods, grinding wheels, clamps, etc is to be provided by the Gas Contractor.

#### **Pipe Bedding**

Pipe bedding shall meet the requirements for Pipe Bedding as contained in Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

#### **Flowable Fill / Low Strength Mortar Mix**

Flowable fill & Low Strength Mortar shall meet the requirements of the Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction. Low Strength Mortar is required as backfill under all existing and proposed KYTC roads.

**Surface Restoration Materials (Temporary and Permanent)**

All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

**2.3 Contractor Requirements for Coiled MDPE Pipe Delivery & Handling**

Coiled pipe will not be used on this project.

**3.0 JOINING PIPE**

**3.1 Welding Steel Pipe**

All welds will be made in accordance with Duke Energy's Gas Division welding specifications. The Gas Contractor is responsible for ensuring that the proper Welding Specification is used for the grades and wall thicknesses of pipes being welded together.

Specification No. 501-2      Standard Welding Procedure SA-II-A-II: For Steel Pipe With O.D. from 2 3/8" to, and including 12 3/4 " and wall thickness 0.188" to, but not including 0.250"

Specification No. 501-3      Standard Welding Procedure SA-III-A-III: For Steel Pipe with O.D. greater than 12 3/4 " and wall thickness 0.250" to, but not including 0.344"

Specification No 501-20      Standard welding Procedure SA-F1-A-V: for fillet welds on steel pipe for socket –weld couplings, slip-on flanges, and full encirclement welding sleeves.

All welders must be pre-qualified in accordance with Duke Energy's Gas Division specifications prior to the start of construction. All testing for welders will be in accordance with API Standard 1104, Section 3.3 at the Gas Contractor's cost. The Inspector will visually inspect all welds.

**3.2 Joining Plastic Pipe**

Butt fusion will be considered the primary method of joining longitudinal sections of MDPE main. Rotary scrapers will be required when joining 4" and larger pipe in the trench. Electro-fusion may be used at the discretion of the Inspector. Electro-fusion couplings are the second choice in joining MDPE pipe. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe.

Bar clamps must be used to secure 2" pipe and larger pipe when joined by electrofusion. Personnel found joining pipe without the proper line up clamps and fusion equipment will lose

their fusion cards. **NO SECOND CHANCES WILL BE GIVEN FOR SHORT CUTS TAKEN WHEN JOINING PIPE.**

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

## 4.0 GAS MAINS

### 4.1 Inspection

**The road contractor must contact Duke Energy (Mike Maschmeyer 513-678-6098) one month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project.** Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Gas Inspector AND the KYTC Resident Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Resident Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

### 4.2 Depth and Location of Main

As of October 27, 2004, KYTC requires that all newly installed underground utilities be buried at a minimum depth of 42" under roadways, ramps, and ditch lines, and 30" in all other areas within state right-of-way. Gas mains crossing under state routes must have a minimum depth of 60" from final grade.

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or the Gas Inspector AND the KYTC Resident Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Resident Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.** Spreadsheets containing the coordinates (Station and Offset) and top of main elevations of the proposed alignment are attached to end of these specifications.

### 4.3 Installation Methods

Direct bury is the preferred installation method for the gas main replacement work within the Road Project. Directional drilling of main is an alternative installation method that will be considered by the Duke Energy Engineer AND the KYTC Resident Engineer on a case-by-case basis. The following paragraphs discuss these installation methods.

#### 4.3.1 **Direct Bury**

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 4 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. Plastic mains crossing State of Kentucky maintained roadways

shall be encased in steel pipe of sufficient diameter (see GD-150) to contain the main. The minimum trench width shall be 24 inches + the outside diameter the gas pipe. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

Once the pipe has been joined, the contractor shall lift and carefully lower the pipe into the center of the trench. The Gas Contractor is cautioned to handle the pipe carefully so as to minimize damage to the pipe. Additional bedding material shall be placed around the pipe and compacted in equal lifts so as to avoid lateral displacement. Bedding material shall be placed in lifts not to exceed 6 inches compacted depth. Bedding material shall be placed to a level approximately 12 inches above the pipe barrel. Bedding material shall not exceed the approximate 12 inches level over the pipe barrel. The bedding material under, around, and over the pipe shall be compacted using a vibratory compactor.

Once the pipe has been placed, trench excavated material or flowable fill shall be used to backfill the remainder of the trench. Trench excavated material shall be placed in the trench and shall be compacted to 95% maximum standard Proctor density with hand operated equipment. The Gas Contractor may use flowable fill for trench backfill at his cost. **When installing gas mains under existing or proposed KYTC roadways, the contractor must backfill with flowable fill to the subgrade elevation.** The cost of this flowable fill shall be incidental to the gas bid items. Granular material shall not be used as trench backfill.

#### 4.3.2 Directional Drilling

Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. **The Duke Energy Engineer must approve all directional drilling.** The Gas Contractor must record the location and depth of the directional-drilled gas main at an interval of fifty (50) feet or less. The Gas Contractor shall excavate a test hole at least every 200-feet of bore to verify the location and depth of the drilled gas main.

For all directional-drilled gas main, the location and depth of all sewer laterals shall be determined and documented prior to drilling to insure there is no conflict between the proposed gas main and the existing sewer. A Sewer Lateral Location Plan must be submitted to Duke Energy and approved prior to the Gas Contractor performing any directional drill work; no additional money will be paid for this plan. **The gas contractor must perform a pre and post camera of all sewer lines and laterals.** Acceptable methods for locating the laterals are a camera or by physically uncovering the lateral. The Gas Contractor must install a sewer tag on every sewer clean out. Duke Energy will supply these tags.

#### 4.4 Backfill

Backfill shall be compacted to 95% optimum density throughout the project regardless of location unless otherwise shown in the plans or directed by the Engineer. Granular backfill will not be allowed.

#### **4.4.1 Flowable Fill (Low Strength Mortar Material)**

When installing gas mains under existing or proposed roadway pavement, or when shown on the plans, the contractor must backfill with flowable fill to the subgrade elevation.

#### **4.5 Lowering Main in Place**

The Gas Contractor shall excavate along existing gas mains and lower the top of the mains in place to the elevations specified on the Gas Plans. The length of trench either side of the point to be lowered, required to ensure stresses are minimized in the pipe after it is lowered, is specified on the Gas Plans. Lowering mains in place shall be accomplished by:

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.
- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeepped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 6" of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

**The lowering of main in place shall only be done by Duke Energy approved Gas Contractors or Duke Energy Crews.**

#### **4.6 Damage to Gas Facilities**

The Gas Contractor must notify the Duke Energy Inspector whenever gas leaks or any questionable situation is encountered. The Gas Contractor shall not repair any active services or mains that may be damaged during construction.

#### **4.7 Casing Pipe**

##### **4.7.1 Casing Under State of Kentucky Roads**

All plastic piping placed under existing or proposed State of Kentucky Roads shall be encased in coated steel pipe, unless an exception has been received from KYTC. The top of the casing pipe

shall be a minimum of 4 feet below final grade of all roads between opposing roadside ditch lines. All welded joints shall be water tight and coated. The casing shall be cathodically protected with anodes. The ends of the casing pipe shall be sealed with link seals, foam, or other water resistant material. A test connection and test box shall be located at one end of the casing pipe.

#### **4.7.2 Casing under Railroad Tracks**

Agreements between Duke Energy and the Railroad must be signed before any utility work is performed on Railroad property. Railroad crossings require steel mains encased in steel casing if the top of the casing pipe is installed between 5.5 feet and 10 feet below the base of the rails. Un-cased steel mains can be installed if the top of the main is installed below 10 feet from the base of the rails. The Gas Contractor shall follow the terms and conditions outlined in the Crossing Agreement.

Railroad personnel are required to be present at the time of the crossing. The Gas Contractor must notify the Railroad before the crossing. Bored and Jacked installations shall have a borehole diameter essentially the same as the outside diameter of the casing pipe. The top of the casing pipe shall be more than 5.5-feet below the base of the railway rail. The carrier pipe shall be centered in the casing pipe and sealed and vented in accordance with Duke Energy Standards.

#### **4.8 Leak Testing**

Leak Testing shall be performed on all newly installed gas main. The contractor must supply all test gauges and the appropriate certification to Duke Energy prior to performing any air leak test on installed piping facilities. The testing equipment must be certified annually and the certification sent to Duke Energy Gas Engineering. The contractor will also be required to have certified purging equipment.

#### **4.9 Hydrostatic Testing**

The contractor must supply all labor, equipment, and material to perform and complete the hydrostatic testing of all installed feeder line. Dead weight testers, temperature, and pressure recorders (8" diameter minimum chart size) must be certified for accuracy within the last 6 months of their use date. The contractor will also be required to have certified purging equipment. The minimum test pressure is 750 psi (1.5 x design MAOP) and the preferred test media is water. The maximum test pressure should not exceed 50% of the pipes SMYS. If elevation differences between the low and high spot along a test section are significant, pressure gauges should be placed at these locations to ensure that the minimum test pressure of 750 psi is reached for the entire length of main. The minimum hydrostatic test length is 8-hours. All hydrostatic test waters shall be disposed of in accordance with local and state regulations.

#### **4.10 Gas Main Tie-Ins**

The Gas Contractor will be required to complete most tie-ins. However, **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will

require squeezing off the main and installing the appropriate saddles. Tie-ins on cast-iron mains will require making appropriate taps for connecting. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains. The Gas Contractor is not required to purchase 8" and 12" T D Williamson and other pertinent equipment; however, Duke Energy would like the Gas Contractor to own this equipment.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- Stopper bags for 2-inch through 12- inch cast iron.
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

It will be the responsibility of the Gas Contractor to meet with the Duke Energy inspector, prior to scheduling any tie in work, to discuss the equipment and personnel necessary to perform the work. Duke Energy will provide pressure crews to assist on tie in and purging activities.

Wipe test are required when performing tie-ins over 4" in diameter. The Gas Contractor must notify the Gas Inspector whenever liquid condensate is visible in the existing mains. The Road Contractor is responsible to provide a space for a roll off box if it is determined that there is PCB contaminated pipe on site. The Gas Contractor is responsible to keep the roll off box covered at all times. Duke Energy will provide the roll off box and dispose of any PCB contaminated pipe found on site.

The Gas Contractor must supply all labor, equipment, and material necessary to abandon mains that are replaced in the road project. This work includes purging, capping, sealing, cutting, or removing and disposing of sections of abandoned main.

**Tie-ins on many Duke Energy mains are pressure and/or temperature dependant. Duke Energy will not allow tie-ins to be made on most mains between November 1 and April 30 if the temperature is below 45 degrees Fahrenheit. During this time of year tie-ins will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.**

**Any tie-in completed by the gas contractor will be paid for by Duke Energy. Tie-in work will not be included in the road contract.**

#### **4.11 Restoration**

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor;** however, the Gas Contractor may have to perform some restoration to maintain traffic and insure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Resident Engineer. The

KYTC Resident Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

## **5.0 GAS SERVICES**

The Gas Contractor will be required to renew customer services from the gas main to the customer's service meter. The service lines are broken into two portions: the main to curb cock portion (M-C) and the curb cock to service meter portion (C-M). The M-C portion of the gas service line is usually contained entirely within road right-of way. The C-M portion of a service line is mostly on private property, but a portion of it may be within road right-of-way. Duke Energy and its contractors are solely responsible for gas work performed outside the road construction limits.

The Gas Contractor is required to complete all associated Job Control Forms (JCF's) with the service work. JCF's must be completed within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.

### **5.1 Main to Curb (M-C) Services**

M-C services are broken up between short-side and long-side M-C. M-C short side services are less than 15 feet in length, regardless of the installation conditions. M-C long side services are over 15 feet in length and usually cross under roadways. It is possible to have all long side (crossover) services on a project. The main to curb portion of the service lines must be installed at the depth of the relocated main, this is particularly critical when crossing existing or proposed roads with the long-side piping.

### **5.2 Curb to Meter (C-M) Services**

C-M services that do not pass the required pressure test or services that are metallic (steel or copper) will be renewed. The renewal work shall include turning on and off the services, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set, setting a new meter bracket, replacing the meter as required, and re-lighting the customer appliances. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property.

Existing polyethylene services shall be reconnected to the new mains if it passes testing. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer bad appliances and notify the Gas Inspector of the problem. Duke Energy will deal with the customer. Contact the gas inspector whenever anything unacceptable is found.

Conversion projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The Gas Contractor must make arrangements with the Gas Inspector to Leak Survey every C-M service

the same day it is installed. All service holes outside the pavement area are to be covered with ¾" plywood and flasher barricade.

The Gas Contractor will be required to replace tin meters and mercury regulators associated with the renewal of curb to meter services. This replacement cost must be included in the curb to meter renewal unit price. Duke Energy will train Gas Contractors for free on the policies associated with spotting unacceptable meter and house service line locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

## **6.0 DESCRIPTION OF PAY ITEMS**

This section describes the gas utility pay items for this project. Pay items are broken up in to two categories:

- 1.) Pay items billed to the Road Contractor; and
- 2.) Pay items billed to Duke Energy directly.

### **6.1 Pay Items Billed to the Road Contractor**

The Gas Contractor shall invoice the Road Contractor for all contracted pay items under **Section 7.1** according to the actual units installed. **The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.** The Road Contractor shall pay the Gas Contractor for actual quantities installed and not for those estimated on the bid sheet. The Road Contractor shall be reimbursed by KYTC. KYTC will bill Duke Energy for the gas facility work after the entire Road Project is completed.

#### **6.1.1 Length of Gas Main Installed**

The length of gas main will be **paid on a linear foot or meter basis** based on the type and size of pipe installed. Payment will only be made for main that has been placed into service. Each size pipe shall be measured along the centerline of the pipe through fittings and casements from end to end. Where the pipe changes size, the particular size pipe shall be measured to the center of the transition fitting. No payment will be made for temporary offsets. **No additional payment will be made for rock excavation or extra depth; bidders must draw their own conclusions as to the subsurface conditions to be encountered.**

This item shall include all costs for labor, equipment, and materials (besides pipe and fittings) necessary to install the gas main. Installation of gas main shall include costs for the following:

- Mobilization,
- Saw cutting pavement,

- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,
- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,
- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,
- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

No additional payments will be made for restoration and backfill if mains are directional drilled instead of direct buried.

#### **6.1.2 Lower Main In Place**

Gas mains lowered in place will be **paid on a linear foot or meter basis** of excavated trench per the size of pipe to be lowered. If service lines have to be relocated for the lowering, they will be paid for under the appropriate bid item. **No additional payment will be made for rock excavation, flowable fill, or extra depth.**

#### **6.1.3 Boring – No Casing**

This unit will be **paid on a linear foot or meter basis** for bores required to install 8 inch and larger steel main. The cost for bores required to install 6-inch and smaller mains must be included in the main installation unit price. This unit shall be reported for payment by size of the pipe installed in the bore regardless of the size of the bore and shall include all costs associated with completing the bore as well as setting up the bore machine. The cost of installing the gas main in the bore is in addition to the cost of the actual bore and should be reported for payment under length of gas main installed.

#### **6.1.4 Boring With Steel Casing**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Engineering Standard 2.12.1. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

#### **6.1.5 Steel Casing – No Bore (Open Cut)**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the trench. This work shall include joining the casing pipe, coating welds, installing anodes, installing test connections and test boxes, and sealing ends around carrier pipe. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed.

#### **6.1.6 Valve Assembly**

Valve assemblies will be **paid for on a lump sum basis** for the type and size of valve installed. The unit price for each valve installation includes setting the valve box to proper grade and the installation of pressure stems in accordance with the appropriate standard. For steel valves, the cost of welding the companion flanges, bolting the valve to the companion flange or welding the valve directly onto the line is included in the valve installation unit.

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

#### **6.1.7 Main Tie-Ins**

Main tie-ins will be **paid on a lump sum basis** based on the size and type of main. The lump sum costs shall include:

- All time associated with separating the existing facilities and reconnecting to the new main,
- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with standards,
- Abandonment of the existing facilities to include purge and sealing the main ends in accordance with standards,
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required

- Surface restoration

Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins to insure completion in a timely manner.

#### **6.1.8 Services - Main to Curb (M-C) Short Side & Long Side**

Main to Curb (M-C) service work shall be **paid on a lump sum basis**. This item shall include all labor, equipment, and materials, necessary to install the gas service. This bid item includes installing 4 inch x 1 inch plastic stab tee, 1 inch plastic cap (at tee and end of service), plastic curb box (bottom and top), curb box lid, and necessary 1 inch plastic pipe with tracer wire. This item also includes air testing service and tapping tee. Services shall be installed with a 12-inch horizontal separation from the existing service.

M-C service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

## **6.2 Pay Items Billed to Duke Energy**

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, not included in the road contract including all tie-ins, Curb to Meter service renewal related work and any additional work determined necessary by the Duke Energy Engineer. The Gas Contractor will be paid for, if possible, according to the current calendar years negotiated rates submitted for the Accelerated Main Replacement Program (AMRP).

The Gas Contractor shall only bill one project per invoice; do not send two or more projects on one invoice. The Gas Contractor shall not add any items to the pay sheets after the Gas Inspector has signed them. Additional pay items shall be placed on a separate pay sheet and signed by the Duke Energy Inspector.

**The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.**

### **6.2.1 Services - Curb to Meter (C-M)**

Curb to Meter service renewal will be **paid on a lump sum basis** by line size (1" or 1-1/4", 2", 3", 4", etc) and type of installation (direct bury, drill, or insertion). The curb to meter price shall apply to a service up to seventy (70) feet. Any footage required over 70 feet will be paid at the price of \$ 7.00 per foot (excluding insertions). Payment for curb to meter services will be made when they are placed into service and the restoration and appropriate paperwork is complete on a street.

C-M service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

### **6.2.2 Test & Re-Light**

Test & Re-Light work will be **paid on a lump sum basis** for polyethylene C-M service lines that pass the required pressure test. The Test & Re-Light work includes turning on and off the gas service, separating existing facilities for testing, air testing, re-connecting the meter set, and re-lighting the customer appliances.

If flexible risers are encountered, they will be replaced at the test and relight unit price plus an agreed unit price of \$75.00 for each additional hole excavated. If additional holes are necessary, they shall be added to the road contract by change order at the agreed unit price of \$75 each.

Duke Energy may also arrange for direct payment to the contractor for additional holes in lieu of a change to the road contract.

### **6.2.3 Meter Relocation**

The cost to move meters from an unacceptable location shall be included in the C-M service unit cost; no additional payment will be made. Any house-line piping that must be relocated will be negotiated and paid for directly to the Gas Contractor by Duke Energy on a time and material basis. In the case where the meter is in an acceptable location and the customer asks the Gas Contractor to relocate the meter outside, the Gas Contractor must negotiate a price with the customer for any house line piping that must be relocated.

When moving remote meters to the outside, the Contractor must reuse the existing meter, re-attach the remote reader and verify that reads of the meter and the remote are the same. When moving meters outside make sure to replace a non-temperature compensated meter with a temperature compensated meter.

### **6.2.4 Pressure Conversion Projects**

Replacement projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The installation of regulator vent piping will be paid on an agreed pre-set lump sum price of \$55.00 for piping up to 10-feet in length and be paid on an agreed pre-set linear foot or meterage price of \$2.50 per foot for lengths over ten feet . Any additional holes will be paid at an agreed pre-set price of \$75.00 each.

### **6.2.5 Large C-M Service Reconnection to M-C**

The reconnection of polyethylene or coated steel C-M services 2" and larger to the M-C portion of the service line will be negotiated and paid for directly by Duke Energy on an hourly basis.

## 7.0 INVOICING

**It is the Gas Contractor's responsibility to know how, by whom, and for what he is being paid.**

The Gas Contractor shall invoice the Road Contractor for all work performed to complete items listed under **Section 7.1** and for any extra work negotiated with the Road Contractor. The Road Contractor then invoices KYTC for this work. The Gas Contractor shall talk to the Resident Engineer if the Road Contractor is behind in paying the invoices.

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to: Duke Energy at 139 E. 4<sup>th</sup> Street, Room 460A, Cincinnati, OH, 45201, to the attention of the sponsoring engineer. These addendum items should not be invoiced with items that were bid.

### 7.1 Weekly Pay Sheets

The Gas Contractor must **meet** with the Duke Energy Inspector and the Resident Engineer or inspector on a **weekly basis** to sign off on all pay sheets (preferably Friday evening or Monday morning). The pay sheets must describe all T&M work and break out the costs according to the appropriate Duke Energy work code. The daily sheets should clearly identify the start and stop times for the T&M on each date along with the inspector's signature for approval on that date.

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 9/4/15)

**AMS Construction** – 10670 Loveland Madeira Rd., Loveland, OH 45140  
Phone- 513-794-0410 Fax: 513-794-0414  
Contact: Dale Franklin, Cell Phone - 513-276-0329 [dale@amsdigs.com](mailto:dale@amsdigs.com)

**RLA Investments** – 603 Sheperd Lane, Cincinnati, Ohio 45215  
Office: 513-554-1469 Fax: 513-554-1221  
Contact: Scott Moody, Cell Phone – 513-623-4258, [rlainvestment@fuse.net](mailto:rlainvestment@fuse.net)

**KS Energy Co** – 755 US-50, Millford, OH 45150  
Office: 513-271-5616  
Contact: John Reichenberger, Cell Phone – 513-623-4258, [jreichenberger@ksenergyservices.com](mailto:jreichenberger@ksenergyservices.com)

**Premier Energy Services** - 7383 Dixie Hwy, Fairfield, OH 45014  
Office: 513-889-4575  
Contact: Ron Barton, Cell Phone – 513-333-8484, [rbarton@premierenergyservices.com](mailto:rbarton@premierenergyservices.com)

# 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 ENCASUREMENT 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 ENCASUREMENT 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 ENCASUREMENT 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 complete 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 complete 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 LINE MARKER** This item is for payment for furnishing and installing a ground level 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 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, 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 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 where 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.

# **NORTHERN KENTUCKY WATER DISTRICT SPECIFICATIONS**

**REVISED FOR**

**KYTC ITEM 06-8101.20**

**KY 9**

**September 24, 2015**

**GENERAL INSTRUCTIONS AND SPECIAL NOTES SPECIFIC  
TO NORTHERN KENTUCKY WATER DISTRICT**

1. **PRIOR INSPECTION OF EXISTING METER SETTINGS** The Contractor with the Northern Kentucky Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Northern Kentucky Water District standard shall be noted and parts furnished to the Contractor by the Northern Kentucky Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractors expense. Any old water meter settings removed and not reused shall be turned over to the Northern Kentucky Water District.
2. **SPECIAL BACKFILL NOTE** No sand or granular material shall be used for backfill above 12" over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the Resident Engineer.
3. **GENERAL SAFETY** For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.
4. **MATERIAL HANDLING** Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.
5. **PROTECTION OF PAVEMENT** Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.
6. **NOISE, DUST AND ODOR CONTROL** The Contractors construction activities shall b conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking will not be permitted.
7. **EXCAVATION AND CONSTRUCTION MATERIALS** All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorists view.
8. **PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN** Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractors expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.

9. **UNACCEPTABLE EXCAVATED TRENCH MATERIAL** Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the Resident Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the Resident Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.
10. **BLASTING ROCK** No blasting of rock shall be performed without specific permission of the Resident Engineer. Blasts shall be properly covered and all utilities and structures in the area shall be properly protected. Warning shall be given to all persons in the area who could be affected by the blasting. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property caused by the blasting. All blasting shall be performed in accordance with all regulations of the Kentucky Department of Mines and Minerals and all other governing agencies having jurisdiction. The Kentucky Department of Mines and Minerals, area emergency response agencies, utility companies with utilities in the area shall be notified of the blasting sufficiently in advance.
11. **ABANDONED VALVES** The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.
12. **SALVAGED AND STOCKPILED ITEMS** The Contractor shall salvage all items in a workmanlike manner. Any item damaged by the Contractor thru negligence shall be replaced with new items at the contractors expense. All salvaged items to be stockpiled and picked up by NKWD, shall be stored in a safe place until pickup. The Contractor is to notify NKWD at 859-578-9898 when salvaged items are available for pickup.
13. **CONSTRUCTION PROCEDURE** The successful contractor to prepare construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Northern Kentucky Water District's Engineering Department prior to the beginning of the water utilities relocations.

## MATERIAL SPECIFICATIONS

1. **CONCRETE** All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction current edition and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.
2. **CONCRETE REINFORCING STEEL** All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.
3. **WATER MAIN**
  - A. **DUCTILE IRON PIPE**. Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)
    1. **Material**. The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.
    2. **Minimum Thickness**. Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 52. All pipe shall be clearly marked as to class by the manufacturer.
    3. **Coating and Lining**. The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).
    4. **Fittings & Glands**. Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".
    5. **Polyethylene Encasement**. Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)
  - B. **PIPE JOINTS**
    1. **Push on and Mechanical**. - Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.
    2. **Flanged**. - Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1
      - a. **Gaskets**. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
      - b. **Bolts**. Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

3. **Restrained.** - If restrained joint system is required on the plans, all pipes, bends, tees, etc. shall be restrained push-on joint pipe and fittings utilizing ductile iron components. Restrained joint pipe shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push-on joints for pipe shall be in accordance with ANSI/AWWA C111/A21.11 "Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings." Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 "Thickness Design of Ductile-Iron Pressure Pipe," and shall be based on laying conditions and internal pressures as stated in the project plans and specifications. All restrained joint pipe and fittings shall be boltless, flexible and capable of deflection after installation. Restrained joint pipe and fittings shall be U.S. Pipe's TR FLEX restrained joint system, American's Flex-Ring or pre-approved equal. Restraint of field cut pipe shall be provided with U.S. Pipe's TR FLEX GRIPPER® Ring, TR FLEX Pipe field weldments or pre-approved equal. Method of restraining and laying schedule shall be approved by the District prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 250 psi. unless otherwise noted. **Mechanical joints with retainer gland and Field Lok® gaskets (or approved equals) are not acceptable unless otherwise specified (note: exception for valves and Special Restrained Joint).**

Exception to Restraint Specifications: Valves shall be restrained using mechanical joint restraint devices consisting of multiple gripping wedges incorporated into a follower gland compatible with all mechanical joints or MJ Field Lok conforming to the requirements of ANSI/AWWA C111/A21.11. Gland body, wedges and wedge actuating components shall be cast from 65-45-12 ductile iron and shall have a working pressure of 250 psi. Megalug Series 1100, MJ Field Lok® or approved equal.

Exception for Special Restrained Joints: When called out in bid items, special restrained joint pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel elements spaced around the gasket (Field Lok®, Fast-Grip® or approved equal gaskets). The bend shall be restrained using mechanical joint restraint devices consisting of multiple gripping wedges incorporated into a follower gland compatible with all mechanical joints (Megalug Series 1100®, MJ Field Lok® or approved equal). Restrained push-on joints shall conform to ANSI A21.11 (AWWA C111).

- a. Bell and Spigot Bell and spigot joints shall conform to ANSI A21.6.

#### 4. FITTINGS

- A. DUCTILE IRON FITTINGS. Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.

1. Working Pressures. All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District's service area require materials used, to be of a higher working pressure than 200 psi.)

2. Coating and Lining. The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).
3. Fittings and Glands. All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.
4. Polyethylene Encasement. Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

## B. JOINTS

1. Mechanical. Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.
2. Flanged. Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.
  - a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
  - b. Bolts. Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. Restrained. If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.
  - a. Bell and Spigot. Bell and spigot joints shall conform to ANSI A21.6.

## 5. POLYETHYLENE WRAP

All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105. Ductile iron fittings, valves, and fire hydrant leads used in the installation of P.V.C. pipe shall be included.

- A. Material. Polyethylene wrap shall be a minimum of 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105. Polyethylene tube shall be blue in color.
- B. Installation. The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a 1' overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline

appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

## 6. FIRE HYDRANTS

- A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. FIRE HYDRANTS. Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Northern Kentucky Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to 200 psi working pressure and shall be shop tested to 300 psi hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench 1,000 mm (3' 6") deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located generally in the Covington System and other areas determined by the Engineer (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) position in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Northern Kentucky Water District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Northern Kentucky Water District Standard Thread (Old Cincinnati Thread). The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for 150 psi working pressure and red for areas in excess of 150 psi. Hydrants used in areas in excess of 150 psi working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

All hydrants shall be right hand open, clockwise, except in certain areas of Campbell Co. as specified in Standard Drawings and shall have a direction arrow of operation cast into the dome of the hydrant. Installation per Standard Drawing #109.

- C. INSTALLATION. The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".
- D. Polyethylene Encasement Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105).  
.(See Standard Drawing #109)

## 7. VALVES

- A. **DESCRIPTION.** The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. **GATE VALVES.** Gate valves shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. All external dome and packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the District. All valves shall be designed for a working pressure of 250 pounds per square inch (PSI) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within 3-1/2 feet of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.
- C. **TAPPING SLEEVES AND VALVES.** Tapping sleeves and valves shall be designed for a working pressure of 250 psi. The tapping sleeve together with the tapping valve shall be tested at 250 psi for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 350 psi.
1. **Tapping Sleeves** Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.
  2. **Tapping Valves** Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters for connection to the tapping machine. All external dome, flange and packing bolts shall be stainless steel. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.
- D. **VALVE BOXES** All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.
- E. **BUTTERFLY VALVES.** Unless otherwise specified valves 16 inches and larger shall be butterfly valves rated at 250 psi working pressure and conform to the applicable portions of AWWA Standard C504, latest edition.
1. **Body** - The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of 250 psi. Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.
  2. **Ends** - Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.

3. Discs - Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.
4. Seats - Seats bonded on the discs are not acceptable.
5. Shaft Seals - If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.
6. Operators - The valve operating mechanism shall be for 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 less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within 3 1/2 feet of the finished grade. Extension stems shall be securely fastened to the valve stem.

E. VALVE BOXES All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.

F. AIR RELEASE AND VACUUM VALVES. Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipe line fills and allows the air to re-enter as the line empties. These valves shall be APCO Air Release Valves Model #200-A, 250 psi working pressure, 1", cast iron body and cover. 16" and larger water mains shall be a 2" air release valve and curb stop. Refer to Standard Drawing #106 for reference.

**8. STEEL CASING PIPE**

Casing pipe shall be steel pipe with a minimum yield strength of 35,000 psi with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness	Nominal Diameter Casing Pipe	Normal Wall Thickness
Under 350 mm (14")	0.251"	650 mm (26")	0.438"
350 & 400 mm(14"&16")	0.282"	700 & 750 mm(28"&30")	0.469"
450 mm (18")	0.313"	800 mm (32")	0.501"
500 mm (20")	0.344"	850 & 900 mm(34"&36")	0.532"
550 mm (22")	0.375"	950 – 1050mm(38,40&42")	0.563"
600 mm (24")	0.407"	1200 mm (48")	0.626"

The inside diameter of the casing pipe shall be at least 100 mm (4") greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206.

Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout it's length, particularly at the

ends. There shall not be any metallic contact between the casing and carrier pipe. Casing shall be backfilled with pea gravel or sand after the carrier pipe is installed to prevent pipe movement. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing #104 for installation details.

9. **MATERIAL APPROVAL** Material certification and test samples shall be provided by the Contractor, at the contractors expense, as required by Northern Kentucky Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.
10. **PAVING MATERIALS FOR REPLACEMENT IN KIND** All materials for replacement in kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.
11. **FLOWABLE FILL** This material shall meet the requirements of SPECIAL NOTE 7X of the Kentucky Department of Highways' Standard Specifications for Road and Bridge Construction.

## CONSTRUCTION

- A. GENERAL Installation of water mains and appurtenances shall conform to the latest edition of AWWA Standard C600 for D.I.P.

Water main pipe and fittings shall be laid on a good level foundation with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Pipe shall be laid with the bell ends facing in the direction of laying.

The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the Engineer prior to backfilling of ditch.

- B. HANDLING. Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.
- C. TREE REMOVAL. Stumps of trees designated for removal 12" in diameter and smaller shall be physically removed. Any stump larger than 12" shall be ground down to 6" below final grade level.
- D. DEWATERING. Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.
- E. CONSTRUCTION EQUIPMENT. Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.
- F. TRENCH SUPPORT. Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

**G. NOISE DUST AND ODOR CONTROL.** The Contractor's construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

**H. DISINFECTION AND LEAKAGE TESTING.** See Section "Disinfection and Leakage Testing."

**I. TRENCH EXCAVATION AND BOTTOM PREPARATION.**

1. **General.** The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings or as otherwise specified. During excavation material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted at a site acquired by the Contractor and approved by the Engineer. Topsoil shall be stripped from the excavation area before excavation begins.

Such grading shall be done as may be required to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or other approved methods. The trench shall be sufficiently dewatered so that the laying and joining of pipe is made in the dry. The Contractor shall take whatever action necessary to insure that water pumped from the trench will not damage private property. If necessary the Contractor shall haul trench water to another suitable location for disposal.

Such sheeting and shoring shall be furnished and installed by the Contractor, at his own expense, as may be necessary for the protection of the work, protection of other utilities, protection of structures, the safety of the personnel, and the safety of the public. All shoring shall be removed when the work is completed unless directed otherwise by the Engineer. The Contractor shall also furnish whatever barricades or fencing necessary to provide for the safety of pedestrians in excavation areas and for traffic control as discussed in other sections. All open trenches shall be adequately covered, barricaded and/or backfilled during non-working hours in order to adequately protect vehicular and pedestrian traffic.

The Contractor shall excavate whatever material encountered. Trenches shall be excavated to the widths shown in the table headed "Trench Width" or as otherwise indicated in the plans, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe or conduit on undisturbed soil at every point along its entire length, except for bell holes and for the proper sealing of the pipe joints. Bell holes and depressions in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth, and width as required for properly making the particular type of joint. Additional depth shall be excavated in rock as described elsewhere herein.

Except in cases where the elevations of the water lines are indicated on the plans, trenches for water line shall be of a depth that will provide a minimum cover over the top of the pipe of 36 inches from the indicated finished grade, and avoid interference of the water lines with other existing or proposed utilities. Where the note occurs, "Slope to Drain", the Contractor shall manage to keep a positive slope in that direction in order that air may travel to the air vent. Where paved surfaces are to be disturbed by an open cut,

the Contractor shall provide suitable machinery to cut the edges of the pavement in a smooth straight line.

2. **Rock** The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than 1/2 cubic yard in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.
3. **Blasting Rock**. No blasting of rock shall be done within 40 feet of pipes or structures without specific permission from the Engineer. Blasts shall be properly covered and the pipe or structure properly protected. Warnings shall be given to all persons in the immediate vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the Contractor.
4. **Trench Width**. Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

**Earth**

- a. **Minimum** - outside diameter of the pipe barrel plus 8 inches, 4 inches each side of pipe.  
**Maximum** - nominal pipe diameter plus 24 inches.

**Rock**

- Minimum** – 24" or less, nominal pipe size: outside diameter of pipe barrel plus 12", @ 6" each side.  
**Minimum** - Larger than 24", nominal pipe size: outside diameter of pipe barrel plus 18", @ 9" each side.  
**Maximum** - nominal pipe diameter plus 24".
- b. **Butterfly Valves**. Trench width shall be over excavated 24" on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.
- c. **Structures**. The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed 12 inches from the outside wall and 6 inches below the footer.

5. **Excessive Trench Width**. If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.
6. **Bottom Preparation** The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand or bankrun bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as

practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.

a. Earth. The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel. A minimum of 3" sand shall be installed on the solid and undisturbed ground. The finished trench bottom shall be accurately prepared by means of hand tools.

b. Rock. Where excavation is made in rock or boulder, the trench shall be excavated 6 inches below the pipe barrel for pipe 24 inches in diameter or less, and inches for pipe larger than 24 inches in diameter. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using sand and thoroughly compacted. The bedding material shall be spread the full width of the trench bottom.

7. Water Main Depth. Mains 12" and less in size shall be not less than 36" in depth and no more than 48" in depth, unless otherwise specified. Mains larger than 12" shall be installed as shown on the plans.

8. Excessive Trench Depth. If, for any reason, the trench depth exceeds the trench depth shown on the Plans, the Contractor is responsible for any and all additional cost incurred for the excessive depth.

9. Foundation. The mains are to be built on a good foundation. If, in the Engineer's opinion, the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and the same filled with suitable material. Unauthorized excavation below the trench bottom shall be filled with compacted crushed stone at the Contractor expense.

J. PIPE, VALVE AND HYDRANT INSTALLATION The provisions of AWWA C600 shall apply in addition to the following:

1. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work except when permitted by the Engineer. Unless otherwise indicated in the plans or in Section I, Bid Item Explanations, the material shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved methods. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. After placing a length of pipe in the trench, the spigot end shall be centered in the bell of the pipe and forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress. Any pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe found to be defective before of after laying shall be removed and replaced at the Contractor's expense.

2. Pipe Cutting. The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.

3. **Push-On Joints.** The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.
4. **Mechanical Joints.** Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. **P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.**

1. **Bolt Torque** The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

<u>Size</u>	<u>Range of Torque in foot-pounds</u>
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

5. **Restrained Joints**

- a. **Ball and Socket.** Ball and Socket joints shall be assembled and installed according to the manufacturers recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
  - b. **Push-On.** Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
6. **Setting Valves.** Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of 2'x2'x4" concrete pad as shown in Standard Drawing No. 105.
  7. **Setting Hydrants.** Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the

traffic flange within 100 mm (4") above final grade in accordance to Standard Drawing No. 109. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

8. Thrust Blocking. All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing No. 104. Thrust blocks shall be approved by the Engineer prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the Engineer's representative before the main is subjected to the pressure test.

- a. Concrete Blocking. Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.
- b. Tie Rods. If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.
- c. Restrained Fittings. Restrained fittings, where permitted, shall be subject to the approval of the Engineer.

#### K. TRENCH BACKFILL

All trench backfill shall be free from cinders, refuse, organic material, boulders, rocks or other material which in the opinion of the Engineer is unsuitable. No backfill shall be made with frozen material.

##### 1. BACKFILL

- a. Trench Bottom Preparation. The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 3" of sand bedding shall be used.
- b. Backfill to 12" Over Pipe Barrel. All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.
- c. Remaining Trench Backfill. From 12" above the pipe barrel to the surface, excavated trench material or flowable fill may be used as backfill material. No material shall be

used for backfill that contains frozen earth, vegetation or organic material, debris, rocks 8" or larger measured in any direction, or earth with an exceptionally high void content.

- d. Compaction. All backfill shall be placed in uniform loose layers, not to exceed 12" layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.
  - e. Bulkheads. When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at 100' intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately 3 feet in a direction parallel to the pipe and shall extend from the bottom of the trench to a point 4" below final grade level.
  - f. Flowable Fill as Backfill As required by the Engineer, flowable fill shall be per Special Note 7X of the Ky. Department of Highways Standard Specifications for Road and Bridge Construction.
  - g. Surface Conditions. The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.
- L. INSTALLATION OF PIPE BY BORING OR JACKING. At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.
- M. WATER METERS Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.
- N. CONNECTIONS (TIE-INS) TO EXISTING WATER LINES All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized, shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.
- O. INSTALLATION OF SERVICE LINES Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36" cover from final grade. The trench width shall be as excavated to a maximum of 2'. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards

in the plans or contained herein. Backfill shall meet the same requirements as that described in PIPE TRENCH BACKFILL.

- P. **TEMPORARY SERVICE CONNECTIONS** Contractor shall furnish, install, make connections, and maintain all temporary lines and other appurtenances necessary to run temporary service connections as needed to permit construction. All temporary service pipes crossing streets, commercial driveways, and/or wheelchair ramps must be buried to prevent a traffic/pedestrian hazard.

The pipe, hoses and other materials furnished by the Contractor for use as temporary service pipe, shall be clean, water-tight and fully adequate to withstand existing pressures and all other conditions of use.. Care shall be exercised throughout the installation of all temporary pipe and service fittings to avoid any possible contamination of any mains or house services or contamination of the temporary pipe proper. Contractor must disinfect all temporary line. All temporary lines must be flushed before being hooked to service line.

The Contractor shall be responsible for the regularly testing and recording the chlorine level of the temporary lines. If low levels are encountered, the Contractor shall be responsible for flushing the line to get levels into standard. The Contractor shall perform all connecting and disconnecting of temporary bypass to consumers' services and all back clearing of service lines.

The Contractor shall maintain the temporary water service line in safe and operative condition at all times. Any temporary bypass lines or services crossing a sidewalk or driveway shall be temporarily covered with a rubber ramp provided by the Contractor or bituminous cold patch, compacted by a roller or a mechanical compaction device, provided by the Contractor. Ramping method must be approved by the District prior to use. The Contractor shall be responsible for the maintenance of the temporary ramping method and any damage as a result there-of.

**Q. APPLICABLE SPECIFICATIONS & STANDARDS**

The following specifications and standards form a part of these Specification:

- A. **American Water Works Association (AWWA) Standards**
- B. **Northern Kentucky Water District Standards Drawing & Specifications**
- C. **"Manual of Accident Prevention in Construction" published by the **Associated General contractors of America****
- D. **Kentucky Occupational Safety and Health Administration's "Kentucky Occupational Safety and Health Standards for General Industry" current edition.**
- E. **American National Standards Institute (ANSI)**
- F. **American Society for Testing & Materials (ASTM)**
- G. **Kentucky Division of Water Quality**
- H. **"Recommended Standards for Water Works" current edition**

## DISINFECTION AND LEAKAGE TEST

- A. SCOPE. This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for watertightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.
- B. TEST SECTION. After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.
- C. WITNESS. All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.
- D. GENERAL. All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

Water required for flushing and disinfection work will be provided as stipulated in the temporary facilities.

When it is necessary to interrupt service to water customers, each customer affected shall be notified in advance of the proposed service interruption and its probable duration in accordance with the project requirements.

- E. DISINFECTION PROCEDURE. During construction or after the installation of the pipe and fittings is complete, an approved disinfection method, according to governing standards, shall be used. The disinfection solution shall be allowed to stand in the main and associated appurtenances for a period of at least twenty-four (24) hours.

During disinfection, all valves, hydrants, and service line connections shall be operated to ensure that all appurtenances are disinfected. Valves shall be manipulated in such a manner that the strong disinfection solution in the main from flowing back into the supply line. Check valves shall be used if required.

All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a liquid sodium hypochlorite disinfecting solution prior to installation.

- F. FINAL FLUSHING. Upon completion of chlorination but before sampling and bacteriological testing, Contractor shall remove all heavily chlorinated water from the main and temporary services by flushing with potable water at the maximum velocity which can be developed under the direction and control of the District.

The Contractor shall properly neutralize and dispose of the chlorinated water and flushing water in accordance with all applicable regulations. Contractor shall obtain all special waste disposal permits necessary.

- G. DISPOSAL OF HEAVILY CHLORINATED WATER. Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine

residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

Chlorine residual of water being disposed of shall be de-chlorinated by treating with one of the chemicals listed in the following table:

**Pounds of Chemicals Required to De-chlorinate Various Residual Chlorine Concentrations In 100,000 Gallons of Water\***

Residual Chlorine Concentration mg/L	Sulfur Dioxide (SO <sub>2</sub> )	Sodium Bisulfate (NaHSO <sub>3</sub> )	Sodium Sulfite (Na <sub>2</sub> SO <sub>3</sub> )	Sodium Thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> •5H <sub>2</sub> O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

\* Except for residual chlorine concentration, all amounts are in pounds.

The Contractor shall provide all necessary materials, equipment and labor for applying the de-chlorinating chemical in a manner such that proper mixing and contact time of the chemical and the heavily chlorinated water is obtained for complete removal of chlorine being flushed. The Contractor shall periodically test the flush water to verify that the chlorine residual is zero.

- H. **CHLORINE RESIDUAL TESTS.** Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.
- I. **BACTERIOLOGICAL TESTS.** Sampling and testing of water in the main and temporary services will be performed by the District after final flushing. A standard plate count will be made by the District for each sample.
- J. **REDISINFECTION.** Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be supplied by Contractor at no additional cost to the District.

- K. HYDROSTATIC TESTING. Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of 100 psi over the design pressure 250 psi. at the lowest elevation point of the water main or as directed by the Engineer. The test will be for a two (2) hour duration and will not vary by more than 5 psi. All tests performed for each test section shall be witnessed and approved by a representative of the Engineer, in the event any test is performed without a representative of the Engineer, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

## VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. **REFERENCE MATERIALS** Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control" published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.
2. **PEDESTRIAN TRAFFIC** Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired from the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.
3. **VEHICULAR TRAFFIC** Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.

# Standard Sanitary Sewer Bid Item Descriptions

**S BYPASS PUMPING** This item shall include all labor, equipment, and materials needed to complete a bypass pumping and/or hauling operation for diversion of sewage during sanitary sewer construction. Examples of such operations when bypass pumping and/or hauling may be necessary is during force main tie-ins, manhole invert reconstruction, insertion of new manholes into existing mains, or other similar construction. There may be more than one bypass pumping/hauling operation on a project. This item shall be paid for each separate bypass pumping/hauling operation occurrence as called out on the plans or directed by the engineer and actually performed. There will be no separate bid items defined for length, duration, or volume of sewage pumped or hauled in each occurrence. If a bypass pumping/hauling operation is called out on the plans; but, conditions are such that the bypass pumping/hauling operation is not needed or utilized, no payment will be made under this item. The contractor shall draw his own conclusions as to what labor, equipment, and materials may be needed for each bypass pumping/hauling occurrence. The contractor should be prepared to handle the maximum volume of the sewer being bypassed, even during a storm event. This item shall not be paid separately, but shall be considered incidental, when bypass pumping and/or hauling is needed during cast-in-place-pipe (CIPP) and/or point repair operations. 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).

**S CIPP LATERAL SERVICE INVESTIGATION** This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements and perform the identification, assessment and pre-measurement of all existing and abandoned laterals for the placement of Cured-In-Place-Pipe lining. This item shall be in payment for all lateral service investigation for all sewer segments to be lined as a part of this contract. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be LUMP SUM (LS).

**S CIPP LATERAL REINSTATEMENT** This item is to pay for installing a Cured-In-Place-Pipe liner in service laterals and service/mainline connections to stabilize structural defects and construction inadequacies. This bid item shall include all labor, equipment, materials and incidentals necessary to perform the service lateral reinstatement in accordance with the plans and specifications. Work under this item shall include sewer flow control, pre-installation cleaning, sealing connections to existing sewer main, pre- and post- construction CCTV inspection and final testing of the CIPP system. This item shall also include the "top hat" required by the specifications. All CIPP lateral reinstatements shall be paid under this item regardless of the size or length of reinstatement. No separate bid items of varying sizes or length of CIPP lateral reinstatement will be provided in the contract. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each CIPP lateral reinstatement complete and ready for use.

**S CIPP LINER** This bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract.

All CIPP Liner items of all varying sizes shall include all labor, materials, customer notification, testing, necessary permits, ingress and egress procedures, bypass pumping, pre- construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning and video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing and all other rehabilitation work and incidentals not included under other pay items necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe; but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. 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).

**S CIPP PROTRUDING LATERAL REMOVAL** This item includes all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements, remove a sufficient amount of the protruding tap to insure a proper and safe Cured-In-Place-Pipe lining insertion and perform pre-installation CCTV. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each protruding lateral removed.

**S CONCRETE PIPE ANCHOR** This item shall be constructed on the sewer pipe at the locations shown on the plans in accordance with sanitary sewer specifications and standard drawings. Payment for concrete anchors will be made at the contract unit price each in place complete and ready for use. Each concrete anchor of sewer pipe or force main shall be paid under one bid item per contract regardless of the sizes of carrier pipe being anchored in the contract. 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.

**S 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 force main or gravity sewer 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).

**S ENCASEMENT CONCRETE** Includes all labor, equipment, excavation, concrete, reinforcing

steel, backfill, restoration, and etc., to construct the concrete encasement of the sewer or force 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.

**S 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).

**S 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 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).

**S FORCE MAIN** This description shall apply to all PVC and ductile iron and polyethylene/plastic pipe bid items of every size and type, 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, 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 also include pipe anchors on polyethylene pipe runs as shown on the plans or required by the specifications 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). No separate payment will be made under pipe items when the directional bore pipe is the carrier 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. 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).

**S FORCE MAIN AIR RLS/VAC VLV** This bid item description shall apply to all force main air release/vacuum valve installations of every size except those defined as "Special". This item shall include the air release/vacuum 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/vacuum 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/vacuum 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.

**S FORCE MAIN 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 sewer or force main under streets, buildings, 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).

**S FORCE 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 force 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. Force Main Relocate shall not be paid on a linear feet basis; but shall be 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.

**S FORCE MAIN TAP SLEVE/VALVE RANGE 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:

- Range 1 = All live tapped main sizes up to and including 8 inches
- Range 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.

**S FORCE MAIN TIE-IN** This bid description shall be used for all force 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, testing and backfill required to make the force main tie-in as shown on the plans and in accordance with the specifications complete and ready for use. This bid item shall include purge and sanitary disposal of any sewage from any abandoned segments of force main. Pipe for tie-ins shall be paid under separate bid items. 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.

**S FORCE MAIN VALVE** This description shall apply to all force main 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 force main valves being installed with new force 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, 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, force main valves shall be restrained. Force main valve restraint shall be considered incidental to the force main valve 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.

**S FORCE MAIN 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 force main valve 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.

**S LATERAL CLEANOUT** This item shall be for payment for installation of a cleanout in a service lateral line. This item shall include furnishing and installation of a tee, vertical pipe of whatever length required, and threaded cap. The cleanout shall extend from the lateral to final grade elevation. The size of the cleanout shall be equivalent to the size of the lateral. The cleanout materials shall meet the same specification as those for the lateral. The cleanout shall be installed at the locations shown on the plans or as directed by the engineer. Only one pay item shall be established for cleanout installation. No separate pay items shall be established for size or height variances. 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.

**S LATERAL LONG SIDE** This bid item description shall apply to all service lateral installations of every size up to and including 6 inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap, bends, clean outs, labor, equipment, excavation, backfill, testing, 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 lateral installations where the ends of the lateral connection are on opposite sides of the public roadway. The new lateral must cross the centerline of the public roadway to qualify for payment as a long side lateral. The length of the service lateral 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 lateral 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. 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.

**S LATERAL SHORT SIDE** This bid item description shall apply to all service lateral installations of every size up to and including 6 inch, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap tee, bends, clean outs, labor, equipment, excavation, backfill, testing, 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 lateral installations where both ends of the lateral connection are on the same side of the public roadway, or when an existing lateral 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 lateral 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 lateral 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. 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.

**S LINE MARKER** This item is for payment for furnishing and installing a ground level sewer 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.

**S MANHOLE** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. 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.

**S MANHOLE ABANDON/REMOVE** Payment under this item is for the partial removal and/or filling of any sanitary sewer manhole regardless of size or depth that no longer serves any purpose. Payment shall be made regardless of whether the manhole is or is not in conflict with other work. Any manhole requiring partial removal, but not total removal, in order to clear a conflict with other work shall be paid under this item. All manholes partially removed shall be removed to a point at least one foot below final grade, one foot below roadway subgrade, or one foot clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected by the contractor, the remaining manhole structure shall be refilled with flowable fill. Payment for disposal of a sanitary sewer manhole will be made under this item only. 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.

**S MANHOLE ADJUST TO GRADE** Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting; but, shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this 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.

**S MANHOLE CASTING STANDARD** Payment under this bid items is for furnishing of a new standard traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. 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 installed.

**S MANHOLE CASTING WATERTIGHT** Payment under this bid item is for furnishing of a new watertight traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. 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 installed.

**S MANHOLE RECONSTRUCT INVERT** This bid item is to pay for all labor, equipment, and material for rework of the manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot as required by utility specification, standard drawing or plan. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING, or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. 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.

**S MANHOLE TAP EXISTING** This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each core opening added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. 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.

**S MANHOLE TAP EXISTING ADD DROP** This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, addition of a vertical drop pipe to the outside of the manhole, placement of reinforcing steel and concrete to encase vertical pipe, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each drop added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and

scope of work needed to comply with the specifications, standard drawings, and plans. 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.

**S MANHOLE WITH DROP** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with drop. Payment for drop manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Drop manholes shall include concrete base, barrel sections, drop materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. 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.

**S MANHOLE WITH LINING** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with corrosion resistant lining. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup in accordance with the standard drawings. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. 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.

**S MANHOLE WITH TRAP** Payment under this item is for the installation of a new manhole with trap. Payment for trap manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Trap manholes shall include concrete base, manhole structure and trap materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. 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.

**S PIPE** This description shall apply to all PVC and ductile iron gravity sewer pipe bid items of every size and type 8 inches internal diameter and larger, 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,

tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, restoration, pressure or vacuum testing, temporary testing materials, video inspection, 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. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lamp holes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. 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).

**S PIPE POINT REPAIR** This item is to be used to pay for repair of short lengths of existing sanitary sewer pipe that, through prior video inspection or other means, are known to have pre-existing failure. Pipe Point Repair may be needed in preparation for installation of cured-in-place-pipe (CIPP) lining or other instances where failure is known and repair is prudent. The size of pipe shall not be defined in separate bid items. All diameter sizes of point repair shall be paid under this one item. The materials to be used to make the repair shall be as defined on the plans or in the specifications. This bid item shall include all excavation, pipe materials, joining materials to connect old and new pipe, bedding, and backfill to complete the repair at the locations shown on the plans or as directed by the engineer, complete and ready for use. This bid item shall include bypass pumping when required. 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).

**S PUMP STATION** This item is for payment for installation of sanitary pump stations including 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) for each when complete.

**S STRUCTURE ABANDON** This item is to be used to pay for abandonment of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, 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 sewer construction, (i.e., abandonment of standard air release/vacuum valves 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.

**S STRUCTURE REMOVAL** This item is to be used to pay for removal of larger above or below ground sewer structures such as air release/vacuum valve vaults, 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 sewer

construction, (i.e., removal of standard air release/vacuum valves and their structure 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.

# Standard Sanitary Sewer Bid Descriptions

**S CIPP LINER** This bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract. All CIPP Liner items of all varying sizes shall include all labor, materials, customer notification, testing, necessary permits, ingress and egress procedures, bypass pumping, pre-construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning and video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing and all other rehabilitation work and incidentals not included under other pay items necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe; but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. Please refer to the Sanitation District #1's CIPP and Rehabilitation Specifications. Paid LINEAR FEET (LF).

**MANHOLE** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Sanitation District #1's Specifications, Section 02606 - Manholes. Paid EACH (EA) when complete.

**S MANHOLE ABANDON/REMOVE** Payment under this item is for the partial removal and/or filling of any sanitary sewer manhole regardless of size or depth that no longer serves any purpose. Payment shall be made regardless of whether the manhole is or is not in conflict with other work. Any manhole requiring partial removal, but not total removal, in order to clear a conflict with other work shall be paid under this item. All manholes partially removed shall be removed to a point at least one foot below final grade, one foot below roadway subgrade, or one foot clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected by the contractor, the remaining manhole structure shall be refilled with flowable fill. Payment for disposal of a sanitary sewer manhole will be made under this item only. Please refer to the Sanitation District #1's Specifications and Standard Drawing 107 – Abandoned Manhole and Pipe. Paid EACH (EA) when complete.

**S MANHOLE ADJUST TO GRADE** Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Sanitation District #1's Specifications, Section 02606 – Manholes and details provided on the construction plans. Paid EACH (EA) when complete.

**S MANHOLE CASTING STANDARD** Payment under this bid items is for furnishing of a new standard traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Sanitation District #1's Specifications, Section 02606 - Manholes. Paid EACH (EA) when installed.

**S MANHOLE RECONSTRUCT INVERT** This bid item is to pay for all labor, equipment, and material for rework of the manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot as required by utility specification, standard drawing or plan. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING, or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. Please refer to the Sanitation District #1's Specifications, Section 02606 - Manholes. Paid EACH (EA) when complete.

**S MANHOLE WITH LINING** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with corrosion resistant lining. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup in accordance with the standard drawings. All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Sanitation District #1's Specifications. Paid EACH (EA) when complete.

**S PIPE** This description shall apply to all PVC and ductile iron gravity sewer pipe bid items of every size and type 8 inches internal diameter and larger, 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, tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, restoration, pressure or vacuum testing, temporary testing materials, video inspection, backfill, 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. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item

shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lamp holes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. Please refer to the Sanitation District #1's Specifications, Section 02610 – Pipe and Fittings. Paid LINEAR FEET (LF)

**S PIPE POINT REPAIR** This item is to be used to pay for repair of short lengths of existing sanitary sewer pipe that, through prior video inspection or other means, are known to have pre-existing failure. Pipe Point Repair may be needed in preparation for installation of cured-in-place-pipe (CIPP) lining or other instances where failure is known and repair is prudent. The size of pipe shall not be defined in separate bid items. All diameter sizes of point repair shall be paid under this one item. The materials to be used to make the repair shall be as defined on the plans or in the specifications. This bid item shall include all excavation, pipe materials, joining materials to connect old and new pipe, bedding, and backfill to complete the repair at the locations shown on the plans or as directed by the engineer, complete and ready for use. This bid item shall include bypass pumping when required. Measurement shall be from contact point to contact point of old and new pipe. Please refer to the Sanitation District #1's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid LINEAR FEET (LF).

## Manhole Rehabilitation Sanitation District No.1 of Northern Kentucky

### Part 1 General

#### 1.1 Description of Services

The Contractor shall rehabilitate existing sanitary sewer manholes as designated within the project area. The manholes shall be rehabilitated using Cured-In-Place Liner and Pipe End Seals.

This contract will be administered and performed under the direction and inspection of SD1 Project Managers. The Contractor's performance under this contract will include services to rehabilitate the entire manhole, which may include the invert, in order to eliminate infiltration and providing corrosion protection. The Contractor shall furnish all labor, components, materials, tools, and appurtenances necessary for the performance of such rehabilitation services.

#### 1.2 Reference Documents

All work must also conform to the latest edition of the following specifications:

- A. SD1 Rules and Regulations
- B. American Society for Testing and Materials (ASTM). These shall pertain to product material, installation, testing, final acceptance, etc. as applicable and as referenced in the product manufacturer's literature.

#### 1.3 Responsibilities

- A. Contractor shall utilize qualified, careful, and experienced workers to execute the Work using industry best practices.
- B. The Work shall be complete and all labor, materials, and services not expressly called for, but which are necessary for proper, complete and safe performance of the Work shall be provided by Contractor at no additional compensation.
- C. Contractor shall safeguard workers and visitors from unsafe conditions and atmospheres on-site for the duration of the Project.
- D. All Contractors' personnel on-site shall wear apparel (e.g., hat, shirt, coat, etc.) that identifies them as employees of Contractor. Failure to dress properly will result in being denied access to the site.
- E. Contractor shall be required to notify the local cities or jurisdiction and obtain all permits and approvals to conduct traffic control in the work area. Contractor shall make use of all reasonable means to maintain the normal flow of traffic around the

work area during the inspection. Contractor shall erect suitable warning lights, signs and/or traffic control devices.

- F. Contractor acknowledges and agrees that sewers, tunnels and other subsurface water conduit systems are inherently dangerous due to factors such as asphyxiation risks, the presence of methane gas, other combustible materials, or possible structural and infrastructure defects. Contractor recognizes the potential dangers associated with confined space activities and shall require its personnel to observe proper safety precautions and procedures. Contractor represents that it has the requisite knowledge, experience, trained personnel, and equipment to perform the Work required of Contractor under this Contract including but not limited to, entry of sewer manholes and other confined spaces, and operation of cleaning equipment.
- G. Contractor is without complete knowledge as to the content and nature of the hazardous conditions related to the work, and further that it is without complete knowledge as to the nature or the degree of the hazards that might arise therefrom. Any person or persons who work on the various sites and sewer systems, examine the sites, or conduct any activity on or in the vicinity of the site do so at their own risk. SD1 assumes no liability whatsoever for any damage, loss or injury of any kind arising in any way from such entry upon, examination of, or activity on or in the vicinity of the Site by any person or persons.

SD1 has no actual knowledge of any Hazardous Environmental Conditions with the required work to be conducted. Hazardous Environmental Conditions shall be presented to the Contractor by SD1 if prior knowledge or information is available. The Contractor shall be responsible in determining if Hazardous Environmental Conditions are present and/or discuss any concerns with SD1 for a potential solution.

- H. Contractor shall submit to SD1 a written Health and Safety Plan (HASP) that documents compliance with applicable local, state, and federal worker safety regulations including, but not limited to Contractor's Written Permit-required Confined Space Entry procedures for all Work within manholes, catch basins, and sewer lines and associated traffic control procedures for all Work within roadway right-of-ways. The HASP shall include, but not be limited to, documentation of OSHA-required training for all personnel involved in the confined space entry procedures and a listing of safety equipment that will be used on the project. Contractor shall submit the HASP to SD1 at least 14 calendar days in advance of the anticipated start date of the Work.

All operations shall be performed by the Contractor in strict accordance with OSHA and any applicable local safety requirements. Particular attention of the Contractor is directed to safety regulations for excavations and entering confined spaces.

- I. Contractor's HASP must be acceptable to SD1. SD1's determination of acceptability of Contractor's HASP shall not give rise to any duty on the part of SD1 to the Contractor or to any other party and such acceptance shall not diminish the

Contractor's obligation with respect to the safety of persons and property, nor shall it extend to means, methods, techniques, procedures of construction or the Work, or to whether the representations made in the HASP comply with regulatory standards or standards of good practice.

No field work shall be done until SD1 has accepted the Contractor's HASP.

- J. At the completion of the Work, Contractor shall restore the work area to its original condition.

#### 1.4 Continuous Pumping Provisions

##### A. Bypassing Sewage Flow

The Contractor shall bypass sewage flow around the manhole to be rehabilitated in a manner that is appropriate to the rehabilitation method. The Contractor shall insure that flow-through plugs, pumps, and bypass lines are of adequate capacity and size to maintain flow throughout the rehabilitation process without sewer backup. Hoses and fittings shall be in good condition, without holes, so as not to cause sewage spills. If sewage backup occurs and enters buildings, or discharges to the waters of the State, the Contractor shall be solely responsible for any cleanup, repair, property damage costs and claims, or resultant regulatory agency fines. A copy of a written release shall be furnished to the Project Manager. The cost of this work shall be included in the unit price bid for the various contract items. If sewage should leak or spill during any of the Contractor's operations under this Contract, the Contractor shall immediately contact the Project Manager and implement emergency containment actions.

##### B. Maintaining Flow

It will be the sole responsibility of the Contractor, throughout the tenure of this contract, to provide and maintain sufficient flow at all times to pass any flash of storm flow of drainage ditches and prevent any backwater flooding due to obstruction caused by construction equipment or materials. The Contractor shall be responsible for prohibiting storm or subsurface water from entering the sanitary sewer during rehabilitation work as may be caused by flash floods, high creek waters, heavy rains, etc.

##### C. Retrieval of Materials and Equipment

It shall be the Contractor's responsibility to remove materials and equipment that have been lodged in a sewer directly or indirectly resulting from cleaning or rehabilitation operations. If excavation is required, the Contractor is responsible for excavation and subsequent repair. Point repairs will not be measured for payment and are considered incidental to the contract.

No extraneous material shall be allowed to directly or indirectly discharge to the sanitary sewer system as a result of the Contractor's operations. All debris resulting from surface preparation, cleaning, and coating application shall be prevented from entering the sewer's flow. All debris and excess materials must be entirely removed

from the manhole and disposed of in a fashion approved by the SD1 Inspector. The Contractor shall be held solely responsible for the cost of any cleaning or additional maintenance to the sewer system performed by SD1 or its agent in response to the Contractor's failure to meet these requirements.

#### 1.5 Maintenance of Traffic

- A. The Contractor shall be responsible for maintaining local traffic at all times and for notifying the proper authorities regarding the closing of the roads. The Contractor will be responsible for obtaining all permits required for traffic purposes.
- B. The Contractor shall not begin work until standard barricades and warning signs are in acceptable position.
- C. The Contractor shall maintain local traffic at all times during construction in a manner causing the least amount of inconvenience to the abutting property owners. Temporary driveways, temporary roadways, or run-arounds as may be necessary to provide vehicular access to and from the abutting properties shall be constructed, maintained, and subsequently removed by the Contractor as directed by the Project Manager.
- D. The portion of the pavement not affected by the manhole rehabilitation shall be kept clear of all material and equipment.
- E. If at any time traffic has to be blocked (emergencies only), the Contractor shall notify the respective fire and police departments of the jurisdiction the work is being performed in.

#### 1.6 Existing Utilities

- A. The Contractor must take the necessary precautions for the protection of any utility encountered on the project or the restoration of any utility damaged during the work.
- B. The Contractor shall notify, at least 48 hours before breaking ground, all public or private service corporations having wire, poles, pipes, conduit, manholes, or other structures that may be affected by this operation, including all structures, which are affected and not shown on these plans.
- C. Supporting and protecting existing water lines, gas mains, telephone conduit, etc., shall be included in payment for the various contract items of work.
- D. All work required for the maintenance of service of existing utilities shall be done by, and at the expense of the Contractor.
- E. All maintenance, repair, and replacement of existing utilities shall be in accordance with the rules and regulations of the various utility companies having jurisdiction.

- F. All existing storm sewers, driveway drains, and other surface drain pipes, removed or damaged during construction shall be repaired and reconnected by the Contractor as directed by the Project Manager at no additional cost.
- G. It is assumed there are water, gas lines, etc. serving each residence. The Contractor shall repair or replace these utilities if damaged at no additional cost.
- H. It shall be the Contractor's responsibility to work equipment around poles, trees, or other obstructions and to do so at his own expense.

#### 1.7 Cleanup

- A. The Contractor shall keep the work area in an uncluttered condition by the frequent removal of debris. The Contractor shall remove all debris and unused material and leave the area in a condition similar to the condition of the area before any work was performed.

#### 1.8 Property Damage

- A. The Contractor is responsible for any damage to private or public property and must promptly notify the assigned Project Manager at the time of the event.

#### 1.9 Access to Municipal Water Supplies

- A. The Contractor shall be required to obtain all the necessary permits and pay all fees required to use the various municipal water works supply systems. All costs for water usage will be included in the various contract items. Water services to residents or other users of the municipal water works system will not be shut off.
- B. Failure to comply with the rules for usage of the water works systems will result in denial of any use of the water works system facility.

## **Part 2 Cleaning and Surface Preparation**

#### 2.1 Cleaning and Surface Preparation

- A. For all lining rehabilitation systems, concrete surfaces shall be pressured cleaned with a minimum of 3500 psi at 2.5 gallons per minute. Manhole wall preparation shall include the plugging and/or patching of all visible leaks, cracks, holes, voids, and deteriorated surfaces in the manholes. Concrete surface defects, such as deteriorated concrete or masonry, hollow areas, bug holes, honeycombs, cracks and voids shall be filled flush and true with manufacturer recommended grouting, plugging or patching compound.
- B. For all manhole rehabilitation systems, the manhole surfaces, including the bench shall be free of leaks for a minimum of 12 hours prior to proceeding with the

application of the manhole rehabilitation product(s). The Contractor shall stop all leaks with patching materials or infiltration control materials that are compatible with the manhole rehabilitation product(s) in accordance with the manufacturer's instructions. The mitigation of severe infiltration may require the injection of chemical grout under pressure. If the Contractor chooses to mitigate all active infiltration by injecting an approved chemical grout the 12-hour waiting period to begin the application of the rehabilitation product(s) may be waived at the final discretion of the SD1 representative.

- C. The Contractor shall remove all existing manhole steps within the surface area to be rehabilitated unless otherwise approved by the Project Manager. The metal portion of all steps shall be removed flush with the manhole wall. A visual inspection by the SD1 Inspector shall yield no indication of the steps' previous location in the rehabilitated wall.
- D. The bench area shall be repaired as further indicated or as directed by the Project Manager. The prepared surface shall be smooth and provide smooth flow through the manhole. The entire surface of the manhole's benches shall be uniformly sloped in such a manner as to direct all water to the manhole's channel.
- E. Inverts shall be rehabilitated at the discretion of the SD1 Inspector. Inverts shall be rehabilitated with the product listed in Part I and as detailed herein.

### **Part 3 Product Application: Cured-in-Place**

- 3.1 The Cured-In-Place Liner is custom fabricated to fit the configuration of each manhole structure. The liner system shall allow rehabilitation of concentric, eccentric or flat top manholes without removing manhole ring, top section, or corbel.
- 3.2 The installation of the approved liner system shall be in strict accordance with the manufacturer's written instructions. The liner shall be a minimum thickness of 100 mils and must contain at least 2 layers of 18oz woven roving fiberglass. Installation shall include re-grouting all inlet and outlet lines and benches as needed. Installation shall additionally include all preparation, installation, and curing and finish operation for the complete rehabilitation process.

The approved liner system shall be PTLs as manufactured by Poly-Triplex with Cured-In-Place Pipe End Seals (as required). CPP Invert shall be manufactured by Epoxytec (as required).

- 3.3 The lining of the structure shall result in a monolithic structure, bonded to the contours of the existing structure. The liner shall be continuously bonded to the interior structure surface, and shall be completely watertight. The Contractor shall be solely responsible for the installation of any chamfers or fillets using compatible patching materials prior to liner installation necessary to ensure continuous bonding of the liner.

- 3.4 All cured-in-place full depth lining systems shall be installed with a minimum bladder pressure of three (3) psi (pounds per square inch) for installation depths of less than ten feet (10'), and five (5) psi (pounds per square inch) for installation depths greater than or equal to ten feet (10') unless otherwise approved by the Inspector.
- 3.5 The installation shall form a structurally enhanced monolithic liner from the junction of the bench and invert channel, to the lip of the casting.
- 3.6 Complete lining of the invert may be required under this contract and is under the discretion of the Inspector.
- 3.7 All epoxy resin and coatings shall adhere to moist surfaces and cure even when submerged in water. Adhesion of the epoxy resin and coatings shall exceed the tensile strength of the concrete, or brick, substrate.

## **SECTION 4 Product Application: Invert Rehabilitation**

- 4.1 Inverts shall be repaired at the discretion of SD1.
- 4.2 Invert rehabilitation shall be performed prior to manhole rehabilitation.
- 4.3 All flow through the invert shall be diverted or bypassed. Pressure clean with a minimum of 3500psi at 2.5 gallons per minute. Scouring or other methods maybe needed to insure a bondable surface.
- 4.4 Shall be a two-component moisture insensitive, highly adhesive, chemical resistant, 100% solid strength epoxy paste with superior adhesion.
- 4.5 Apply a minimum of 1/8" of epoxy to the entire invert. Invert and manhole rehabilitation products must overlap a minimum of 3 inches and bond to one another.
- 4.6 Rehabilitated invert must provide a smooth leak free channel for waste flow.
- 4.7 This item shall be paid for at the unit price bid per each.

## **PART 5 Manhole Rehabilitation Quality Assurance and Testing**

- 5.1 Visual Inspection Performed by SD1
  - A. SD1 will have an Inspector enter selected manholes periodically to ensure that the rehabilitation products meet the final acceptance criteria outlined in other sections of this specification. The Inspector may also impact the coating areas with a hammer and possibly perform destructive and nondestructive testing in order to ensure adequate bonding and thickness of the coating (or lining). The Contractor shall make all repairs to areas of the manhole that are found to be defective. All costs for any repairs shall be at the Contractor's expense.

## 5.2 Statement of Warranty

- A. An unconditional, non-prorated warranty covering all labor and materials, to stop infiltration, material failures, deterioration, defects, etc. will be required by the installer and the manufacturer for a 5 year warranty. All other additional warranties as provided by the manufacturers will be applicable.

## **PART 6 Payment for Work**

6.1 Payment for manhole rehabilitation shall be based on the unit prices as shown on the Bid Pricing Form. Payment for cleaning, plugging, patching, sealing, step removal, and all other work required for manhole rehabilitation shall be included in the manhole rehabilitation unit price items

A. Cured-in-Place Lining

- 1. Liner as described in Part 3 per vertical foot to the nearest 0.1 ft.
- 2. Epoxy Invert Rehabilitation as described in Part 4 per each.

6.2 Payment for invert repair shall be paid on a “per each” basis, complete in place and approved by SD1.

6.3 Each lump sum and/or unit bid price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor’s overhead and profit for each separately identified item.

6.4 Contractor will not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions caused by changes or alterations in the Work as ordered by the Engineer.

6.5 The following items of work will not be measured for payment but the cost thereof will be considered as incidental to the contract:

- A. Records, logs, photos, etc.
- B. Inspection
- C. Removal and disposal of debris.
- D. Traffic control (Signs & Cones).
- E. Bypass pumping and flow control as required. (15” diameter and less/ 2MGD or less)
- F. Providing temporary and final paving at any excavations.
- G. Emergency after hour's response caused by the rehabilitation work.
- H. Demobilization and mobilization because of suspension of work.

END OF SECTION

## SECTION 02606

### MANHOLES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all precast and cast-in-place manholes, air release manholes and bypass pumping vaults.
  
- B. General:
  - 1. Manholes shall conform in shape, size, dimensions, material, and other respects to the details shown or as ordered by ENGINEER.
  - 2. Cast-iron frames, grates and covers shall be as specified in Section 05540.
  - 3. Concrete for cast-in-place manholes and for inverts in precast manholes shall conform to the requirements specified under Section 03300.
  - 4. Floor access hatch covers for air release manholes shall be as specified in Section 05536.
  
- C. Related Sections:
  - 1. Division 2 Sections on Earthwork.
  - 2. Section 03300, Cast-In-Place Concrete.
  - 3. Section 05501, Miscellaneous Metal Fabrications.
  - 4. Section 05536, Floor Access Hatch Covers
  - 5. Section 05540, Castings.
  - 6. Division 15 Sections on Piping.

##### 1.2 QUALITY ASSURANCE

- A. Reference Standards:
  - 1. ASTM C 33, Standard Specification for Concrete Aggregate.
  - 2. ASTM C 76, Class III Reinforced Concrete Pipes.
  - 3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
  - 4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
  - 5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.

6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.
7. ASTM C 923, Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
8. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
9. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
10. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.
11. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
12. ASTM D 1737, Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus
13. ASTM D 2240, Standard Test Method for Rubber Property
14. ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
15. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
16. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
17. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
18. ASTM 4060, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
19. ASTM 4541, Standard Test Method for Pull Off Strength of Coatings using Portable Adhesion Testers
20. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.
21. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
22. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
23. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

### 1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
  1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints

between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base. Design Drawings shall also show the delta angles for all points of intersection, except where more than one line intersects at the same manhole. Where more than one line intersects, the angles relating all lines shall be shown. All angles shall be shown to the nearest second.

2. Manufacturer's name for all precast structures.
- B. Submit a laying schedule of each manhole showing elevations and manhole components to be used from base to casting.
- C. For manhole interior linings, submit a description of the method and materials required to line the manhole. Submit a Material Data Safety Sheet (MSDS) for each product used in the lining. A CIGMAT evaluation shall be submitted, if required. Submittals shall also include, as required, work procedures for flow diversion plans and methods/materials used for repair of leaks and cracks in manholes. If required, submit calculations for the round manhole lining that demonstrate hoop strength under maximum hydrostatic conditions. The calculation shall assume zero liner adhesion to the existing structure, but assume lateral support from the existing wall. The calculated hoop stress shall be less than 11% of the compressive strength as determined by appropriate ASTM test method. Submit a final installation report on manholes that have been lined.
- D. Comply with all the requirements of Section 01340.

## PART 2 - PRODUCTS

### 2.1 PRECAST CONCRETE MANHOLES, AIR RELEASE MANHOLES, AND BYPASS PUMPING VAULTS

- A. General:
  1. Precast manholes shall conform to the details shown on the Standard Details.
  2. Concrete shall be minimum 4000 psi compressive strength.
  3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.
    - a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and shall be concentric cone-type, top construction as

shown on the Design Drawings.

b. Shallow Manholes shall be less than six (6) feet in depth, measured from the base of the cover frame to the invert of the outlet and shall be of flat-top construction as shown on the Design Drawings.

4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.
6. Precast concrete manhole sections (including eccentric and concentric cones, risers and grade rings) shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.
7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only.
8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on inside of barrel.

B. Manhole Bases Sections:

1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
  - a. **NOTE TO SPECIFIER: DESIGN ENGINEER SHALL REVIEW GROUNDWATER & FLOOD ELEVATIONS IN THE PROJECT AREA & THE POTENTIAL FOR FLOATATION OF THE MANHOLES. DESIGN ENGINEER SHALL SUBMIT CALCULATIONS AND GROUNDWATER DATA VERIFYING POTENTIAL FOR MANHOLE FLOATATION.** If floatation is found to occur based on the Design Engineer's review, precast base sections shall be furnished with an integral anti-flotation footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).
  - b. Precast concrete manhole base slab thickness shall comply with the following schedule:

0.0' – 15.0'	Vertical Height	- 8" Slab
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- 15.1' – 20.0' Vertical Height - 10" Slab
  - 20.1' – 25.0' Vertical Height - 12" Slab
  - 25.1' – 30.0' Vertical Height - 14" Slab
  - c. Manholes over 30 feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to SD1 for review & approval.
  - d. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
  - e. There should be a minimum of twelve (12") inches between the outside diameters of all pipe penetrations in the base section.
  - f. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.
2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.
- a. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
  - b. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
  - c. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
  - d. Bench shall slope toward invert at not less than one (1) inch per foot.
3. All precast base sections with pipe openings shall be furnished with ASTM C 923 pipe-to-manhole connector gaskets as specified hereinafter.

C. Manhole Barrel Sections:

- 1. Manhole barrel sections shall have reinforcing steel in their walls, Wall thickness shall not be less than 5 inches.
- 2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.
- 3. The barrel sections shall be of the height required, but not less than one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.
- 4. Joints between manhole components shall be the tongue and groove.

The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel. Joints between the base sections, riser sections and top slabs of manholes 72 inches in diameter and less shall be rubber and concrete joints. Joints for manhole components greater than 72 inches in diameter shall be provided with steel bell and spigot rings.

5. Precast manhole section joints shall be joined with one of the following products:
    - a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
    - b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
    - c. Hamilton-Kent "Kent-Seal No. 2"
    - d. K.T. Snyder Co. "Rub'r-Nek"
    - e. Press Seal Gasket "E-Z Stik"
  6. All precast barrel sections with pipe openings shall be furnished with ASTM C 923 pipe-to-manhole connector gaskets as specified hereinafter.
- D. Cone Sections and Top Slab:
1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case by case basis.
  2. Cone sections and top slabs shall be designed for an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.
  3. Cone sections for standard manholes shall have a minimum 8" thick upper walls and shall not exceed 3'-0" in height.
  4. Concrete top slabs shall not be less than 8 inches thick.
- E. Drop Manhole:
1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.
  2. The drop pipe shall be of the same material and diameter as the inlet sewer pipe used.
  3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of six (6) inches.
  4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by SD1.
  5. Base shall be cast to support drop connection.

- F. Acceptable Manufacturers
  - 1. Aerocrete
  - 2. Sherman Dixie
  - 3. KOI
  - 4. Hanson
  - 5. or equal

## 2.2 PRECAST EPOXY RESIN MANHOLES

- A. General:

Polymer concrete manholes may be installed in lieu of lined concrete manholes. Polymer concrete manholes shall be manufactured in accordance with ASTM D 6783.

  - 1. Design
    - a. Manholes shall be designed to withstand all live loads and dead loads as described in project plans and specifications.
    - b. Dead loads shall include overburden load, soil side pressure and hydrostatic loading conditions.
    - c. Manholes shall also be designed to resist buoyancy for the project conditions.
    - d. Compressive strength: Pipe shall have a minimum unconfined compressive strength of 13,000 psi when measured in accordance with ASTM C 579.
- B. Materials:

Resin: The manufacturer shall use only polyester resin systems designed for use with this particular application.

  - 1. Filler: All aggregate, sand and quartz powder shall meet the requirements of ASTM C 33, where applicable.
  - 2. Additives: Resin additives, such as curing agents, pigments, dyes, fillers and thixotropic agents, when used, shall not be detrimental to the manhole.
  - 3. Elastomeric Gaskets: Gaskets shall be suitable for the service intended. All gaskets shall meet the requirement of ASTM F 477.
- C. Manufacturing and Product Construction
  - 1. Manholes: Manhole components shall be manufactured by the vibratory vertical casting process resulting in a dense, non-porous, corrosion-resistant, homogeneous, composite structure. Manhole bases shall be designed to withstand flotation from groundwater or floodwater and movement from high velocities and/or directional changes in flow. The flow channel, benches and inverts must also be of the same material as the manhole, integral within the manhole and installed by the manhole manufacturer and as shown on the standard manhole details drawing.

2. Joints:
  - a. The manhole components shall be connected with a compatible epoxy bonding agent or an elastomeric sealing gasket as the sole means to maintain joint water-tightness.
3. Joints at pipe tie-ins shall be ASTM C923 flexible pipe-to-manhole connector gaskets, as specified in Section 2.4. Joints shall be watertight. The connector gaskets shall be integral with the manhole wall. Walls shall have sufficient thickness to install the connector within the hole cored in the manhole wall. Pipe stubs cast into the manhole through the wall to provide the additional wall thickness are not acceptable and will not be allowed.
4. Fittings:
  - a. Cones, reducer slabs, base slabs and adjusting rings shall be of the same material as adjoining riser sections.
  - b. Fittings shall be manufactured elastomeric gaskets, epoxy bonding or fiberglass overlay.
5. Manhole Steps:
  - a. Furnish steel-reinforced polypropylene steps as specified in Section 2.6.
  - b. No steps shall be aligned over the flow channel.
  - c. Step spacing is 16" as indicated on the Standard Drawings.
6. Acceptable manufacturer: Manufacturer of pipe and fittings shall employ manufacturing methods and material formulations in use for a minimum of ten years.
  - a. Meyer Rohr +Schacht GmbH
  - b. or equal

### 2.3 MISCELLANEOUS METALS

- A. Metal frames, covers, floor access hatch covers, steps, toe pockets and similar required items shall be provided as shown on the Design Drawings and in accordance with Division 5 Sections on Metal Fabrications.

### 2.4 FLEXIBLE PIPE JOINT SEAL

- A. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.
- B. All connecting elements of the seal shall be Type 304 stainless steel.
- C. Flexible pipe joint seal shall allow for pipe alignment of up to fifteen (15) degrees deflection.

- D. Pipes entering manholes that do not have existing flows and have slopes greater than twenty-six (26) percent shall have fittings (22.5 or 11.25 degree bends) installed immediately outside the manhole.
- E. If a flexible pipe joint seal is provided at each manhole wall penetration and the pipe is not rigidly locked into the manhole wall through grouting or other methods, then the 12" maximum pipe stub shown in the SD1 Standard Drawing No. 113 is not required.
- F. Acceptable Products:
  - 1. Kor-N-Seal by NPC, Inc.
  - 2. A-Lok by A-LOK Products, Inc.
  - 3. Dura-Seal III by Dura-Tech
  - 4. Or equal.

## 2.5 MANHOLE COATINGS AND LININGS

- A. Interior Lining
  - 1. Contractor shall rehabilitate all existing manholes, as shown on the plans, per the guidance below.
- B. Any concrete manhole designated to be lined on the Design Drawings must have a liner selected from one of the four types listed below or the Epoxy Resin type (Deduct Alternate) specified in section 2.2 above.
  - 1. **Type 1 - Cured-in-place PVC composite liner**
    - a. As a minimum the manhole liner systems shall be composed of a multiple layered composite. The primary layer shall be manufactured from 20 mils PVC with 10 ounce per square yard polyester fleece. The surface hairs of the fleece must be embedded in the molten PVC during the manufacturing process of the PVCP laminate. Glued laminates are not allowed.
    - b. The fibrous body will be impregnated with a modified epoxy resin. Add fiberglass and resin, for additional liner thickness.

PVCP20-10=86 mills. (20 mill PVC & 10 oz Fleece). (i.e. no fiberglass).

PVCP20-28=88 mills. (20 mill PVC, 10 oz Fleece & 18 oz Fiberglass).

PVCP20-34=110 mills. (20 mill PVC, 10 oz Fleece & 24 oz Fiberglass).

PVCP20-custom mills (20 mill PVC, 10 oz Fleece & Fiberglass as required).

- c. Liner Thickness: The anticipated hydrostatic head “h” in feet above the bottom of the invert and the Radius “R” in feet of the structure shall determine the necessary liner thickness “t” in mils according to the calculation:  $t = 3.32 \times R \times h$ . Contractor shall calculate “t” for all manholes and provide these calculations to the Owner as part of the liner submittal.
- d. Liner shall be PVC, Multiplaxx™ Liner System or approved equal. Manholes receiving an interior lining shall have a polypropylene ladder in lieu of steps.
  - i. Ladder shall be Lane Vault Ladder or equal.

2. **Type 2 – SPECTRASHIELD**

SPECTRASHIELD shall only be used on existing manholes in rehabilitation applications.

Lining for existing manholes shall be SPECTRASHIELD Liner System as manufactured by CCI Spectrum, Inc., Jacksonville, Florida; 904-268-4951. Materials shall be designed and manufactured to withstand the severe effects of hydrogen sulfide in a wastewater environment.

CCI Spectrum, Inc. (manufacturer) and Applicator warrant the SPECTRASHIELD manhole liner against failure for a period of 10 years. Failure will be deemed to have occurred if the protective lining fails to (a) prevent the internal deterioration or corrosion of the structure (b) protect the substrate and environment from contamination by effluent. If any such failure occurs within 10 years of initial completion of work on a structure, the damage will be repaired to restore the lining at no cost to the Owner within 60 days after written notification of the failure. Failure does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved. There are no warranties express or implied other than those specifically stated in this section 1.03. Any liability for consequential and incidental damages is expressly disclaimed. Liability is limited to and shall not exceed the purchase price paid.

- a. The lining system shall be composed of a multi-layered stress skin palled liner system and installed in accordance with the manufacture’s specifications. The components are described below:

- i. The moisture barrier shall be a modified polymer and shall have a minimum thickness of 50 mils. The modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.
- ii. The surfacer shall be a polyurethane/polymeric blend foam and shall have a minimum thickness of 400 mils. The foam shall be consist of two components with low viscosity and contain flame retardants.
- iii. The final corrosion barrier shall be a modified polymer and shall have a minimum thickness of 50 mils. The modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

The total thickness of the multi-component stress panel liner shall be a minimum of 500 mils.

- b. The components shall meet the following chemical analysis:

(i) Modified Polymer:

**“A Component”**

Viscosity, 77° F, cps., ASTM D-1638	450
Physical State	Liquid
Color	Clear to Amber
Hygroscopicity	Reacts with water

**“B Component”**

Viscosity, 77° F, cps., ASTM D-1638	500
Physical State	Liquid
Color	Flamingo Pink
Hygroscopicity	100 %

**Reaction Profile** (100 grams, 175° F Sample)

Gel Time, seconds	10
Tack Free Time, seconds	20
Cure Time, seconds	90

A System / B System Volume Ratio 1:1

**Typical Physical Properties**

Tensile Strength, PSI	>3600
Elongation, %	>300
Tear Strength, PLI	>5000

Shore a Hardness	96
100% Modulus, PSI	>2500

(ii) Polyurethane Rigid Structure Foam

**“A Component”**

Viscosity, 77° F, cps., ASTM D-1638	200
Physical State	Liquid
Color	Dark Brown
Hygroscopicity	Reacts with water and evolves CO <sub>2</sub> gas

**“B Component”**

Viscosity, 77° F, cps., ASTM D-1638	660
Physical State	Liquid
Color	Transparent Dark
Hygroscopicity	Absorbs water rapidly thus changing ratio

**Reaction Profile** (100 grams, 77° F Sample)

Cream Time, seconds	1-4
Tack Free Time, seconds	5-8
Rise Time, seconds	6-10

A System / B System Volume Ratio	1:1
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**Typical Physical Properties**

Density, nominal, core, lbs/ft <sup>3</sup> ASTM D-1622, 74° F	4-10
Compression Strength, PSI ASTM D-1621, 74° F Parallel Rise	90-150
Closed Cell Content, % ASTM 1940, 74° F	Over 95
Shear Strength, PSI ASTM C-273, 74° F	225-250

3. **Type 3 – Duraplate 100 Liner System**

Lining for manholes shall be PVC Duraplate 100 Liner System as manufactured by ALOK Products, Tullytown, Pennsylvania; 1-800-822-2565. Liner shall be cast integral into the concrete at the point of precast manufacture.

- a. PVC Liner, Channel Joints, H-joints and Corner Joints; Manufactured from polyvinyl chloride resin. White in color to assist in providing a light reflective environment. All sheet compounds shall result in a semi-rigid material for thermoforming to the contour of the structure and shall have a minimum wall thickness of 1.7mm (0.065 inch).
- b. Lined manholes shall have a flat top that is lined with the same type of protective liner as the manhole.
- c. Rubber gasket between structures shall be provided for a watertight seal. Gasket shall be DURA-Plate-Lok-Sealant MT-320 measuring 0.5 inches by 1.5 inches to be placed on the return. When the two sections are coupled, the butyl-lok will displace over the return on the bell and tongue ends of the liner.
- d. Linings shall be installed by a certified lining manhole precaster, while constructing the manhole, in strict conformance with the manufacturer's requirements. The Precaster shall submit certification documentation from ALOK products with the manhole submittals.
  - i. Inspect the form core for sharp or jagged edges that could damage the liner during the precasting and shipping process.
  - ii. Place Dura Plate 100 Liner panels level around the core of the form. Form release agent is not necessary.
  - iii. Install the vertical joints by placing the black rubber strip between the panel returns, making sure that the flap of the strip is fitted over one of the returns.
  - iv. Place backing plate on the inside return of panel that the flap fits over. Hold together with spring loaded clamps evenly spaced about 12" apart.
  - v. Secure the panels together with fasteners placed every 3 inches, making sure that each fastener is tightened to 5 in-lbs.

**Note:** The fasteners must be installed from the side opposite the flap, straight thru the backing plate, parallel to the liner.
  - vi. Repeat for all seams.

**Note:** Caulk can be placed between the form core and liner returns to minimize concrete seepage during production.

- vii. Install reinforcement into form with any other necessary parts needed for the structure.
  - viii. Pour concrete around the liner evenly to prevent shifting of the liner.
  - ix. Vibrate and compact the concrete in a manner that will protect the liner and produce a dense, homogenous structure.
  - x. Take precaution to protect the liner from sharp or jagged objects while stripping from the form.
  - xi. Visually inspect the liner after production for any cuts or tears. If repairs are needed, refer to Dura Plate 100 Liner repair bulletin for proper repair procedures.
- E. Steps shall be installed in each manhole at the point of manufacture. Drill all holes in liner larger than the diameter of the step. Install steps or ladder then caulk area around step and liner with FR500 caulking material (lap Sealant) and seal with a minimum 0.5” thickness of ThoRoc SewerGuard epoxy.
- F. All hole opening surfaces shall be coated with a minimum 0.5” thickness coverage of ThoRoc SewerGuard epoxy that overlaps the liner at least 1 ½ inches.
- G. Manhole Bench and Inverts – The benches and inverts shall be of the same material as the manhole, integral within the manhole and installed by the manhole manufacturer and as shown on the standard manhole detail drawings. The benches and inverts shall be coated with a minimum of 0.5” thickness of ThoRoc SewerGuard epoxy or approved equal. Thickness shall be tested in the field by SD1. CONTRACTOR shall patch all test holes.
- H. The procedure below shall be followed at the factory to determine the thickness of epoxy applied to the benching in manholes and structures manufactured.

Procedure:

1. Utilizing a 40 “L x 1.5“W x 0.5“H Nylon rod:
  - a. Designate each rod with a corresponding number.
  - b. Verify each rod dimension using a caliper.
  - c. Initial and date the measurements.
2. Mark the rod with a line at 1” increments.

3. Cut the rod at each line to form segments of 1" L x 1.5" W x 0.5" H.
4. Once the concrete is formed in the base of the manhole or structure space the segments approximately 18" apart and adhere the segments to the concrete such that the 0.5" H is the distance from top of concrete to the tip of the nylon segment.
  - a. Document the spacing of each segment on the back of the Manhole or Structure Assembly/Inspection Form.
  - b. Initial and date the measurements.
5. As the benching is being applied, it should be above the segments, which are 0.5" H.
6. During the final inspection of the manhole/structure, there should be no visible segments.
  - a. Document the observations on the back of the Manhole or Structure Assembly/Inspection Form.
  - b. Initial and date the observations.
- c. If the difference or thickness of the ThoRoc is 0.5" – 1.0" inches at all reference points, the manhole is acceptable.
- d. If the difference or thickness of the ThoRoc is less than 0.5", the thickness is not correct. Inform proper production personnel of the problem and that it needs to be corrected before the manhole/structure is approved.

4. **Type 4 – SewperCoat**

This specification defines the method and material for the rehabilitation of sanitary sewer structures (manholes, wet wells, lift/pump stations, large diameter concrete pipe, etc.) utilizing a spray applied calcium aluminate cementitious structural rehabilitation system. The purpose of the project is to obtain a dense and durable concrete lining that is resistant to bio-sulfuric acid attack and meets the strength requirements described elsewhere in this specification. The work covered in this specification consists of furnishing all labor, equipment, materials, and supervision necessary to accomplish the rehabilitation as specified. When complete the rehabilitated structure shall:

- a. Provide for a uniformly smooth surface of specified thickness.
- b. Minimize, if not eliminate sources of inflow infiltration (1/1)
- c. Provide a service that is supported by documented test analysis.

### Contractors Sequence of Operation

The Contractor's sequence of operation relative to structural rehabilitation shall include, but not be limited to the following:

- a. Rehabilitate all interior surfaces including walls, ceilings and floors in accordance with specification and nature of the sub-surfaces
- b. Provision to "cure" the installed lining material
- c. Provision to "test" lining and structural rehabilitation materials.

### Submittals

- a. The Contractor shall furnish detailed and complete data pertaining to the surfaces of the structure to be rehabilitated, the rehabilitation product, surface preparation and installation to the engineer for approval. The submission of this data shall be made in a timely manner to prevent project delay. At the request of the Engineer, the Contractor shall test for adverse chemical conditions that may hinder overall product performance.
- b. Prior to initiating the work, the Contractor shall submit specific technical data with complete physical properties of the structure to be rehabilitated and the proposed product for the rehabilitation of the structure, as well as a specific plan for sub-surface preparation.
- c. A work plan.
- d. A safety plan. It is the contractor's responsibility to comply with OSHA standards and all regulations pertaining to the work including confined space entry.

### Materials

- a. Lining material furnished under this specification shall be prepackaged mortar mix, including all cement aggregates, and any required additives. It is the intent of this specification that the Contractor only be required to add the proper amount of potable water so as to produce concrete suitable for spray application. Do not add portland cement, other aggregates, or any admixtures whatsoever to lining material. Typical package weights shall not be less than 50 lbs. and shall be identical for all material furnished on this project.

- b. The chemical composition of the cement portion as well as the aggregates of the mortar mix shall be as follows:

Al <sub>2</sub> O <sub>3</sub>	CaO	Fe * Fe <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>
39-44%	34-36%	9-15%	6-8%

- c. The properties of the mortar mix under standard laboratory conditions are typically as follows:

Compressive Strength (ASTM C 109)	> 5,500 psi	24 hrs
Flexural Strength (ASTM C348)	> 900 psi	24 hrs
Splitting Tensile Strength (ASTM C496)	> 550 psi	24 hrs
Slant Sheer test (ASTM C882)	> 2,500 psi	28 days
Shrinkage at 25 days (ASTM C157)	< 0.07%	
Freeze/Thaw after 300 Cycles (ASTM C506)	< 102	

- d. The mortar mix shall be either “SewperCoat PG” or “SewperCoat 2000HS Regular”, both as manufactured by Kerneos Inc. – Chesapeake, Virginia.
- e. Mortar mix must have at least seven (10) years of successful performance in similar applications and be supplied by and ISO 9001 certified manufacturer. Manufacturer’s ISO 9001 certificate shall be submitted to engineer and owner.
- f. Mortar mix manufacturer shall offer to the Owner a labor and materials replacement limited warranty for a period of no less than 10 years from the date of Owner acceptance of the installation.
- g. In addition, the mortar mix shall be designed to withstand long-term exposure to a bacterially corrosive hydrogen sulfide environment that may be expected to produce a pH of 1 on normal Portland cement based concrete or typical brick and mortar surfaces.
- h. Water used in mixing shall be fresh, clean, potable water, free from injurious amounts of oil, acid, alkali, vegetable, sewage and/or organic matter. Water shall be considered as weighing 8.32 pounds per gallon.
- i. Mortar mix shall be stored with adequate provisions for the prevention of absorption of moisture. It shall be stored in a manner that will permit easy access for inspection and identification of each shipment.

Sampling and Testing

- a. A recognized independent testing laboratory shall test mortar materials used on this project. The Manufacturer, instead of an independent laboratory, may test project

- sample specimens, provided the Owner, Engineer, and Manufacturer are in agreement of this testing method prior to project commencement. Specific materials recommended by the Engineer shall then be tested.
- b. The cost of sampling and testing of the mortar mix during placement and the surface to which it is applied shall be borne by the Contractor. Other testing required showing conformance with these specifications shall be the responsibility of the Contractor. Certified test reports and certificates, when so directed, shall be submitted in duplicate to the Engineer and to such other agencies or persons the Engineer may designate.
  - c. Any material failing to meet the requirements of these specifications shall not be incorporated into the work plan.

#### Qualification of Work Crew

- a. The lining material Manufacturer shall maintain a listing of component contractors that have demonstrated requisite skill and training to be qualified applicators of their materials.
- b. Prior to project commencement, the Contractor must satisfy the Engineer that all Contractor's work crew personnel have performed satisfactory work in similar capacities elsewhere for a sufficient period of time to be fully qualified to properly perform the work in accordance with the requirements of the related specifications.
- c. Foreman shall have at least 4 years' experience with similar work and project conditions
- d. Nozzlemen shall be qualified by having had similar work experience
- e. Work Crew responsibilities prior to application of lining material shall include the following:
  - i. Surface preparation as discussed in Section 4.1.
  - ii. Ensure the operation air pressure is uniform and provides adequate nozzle velocity for proper compaction.
  - iii. Continuously regulate the water content so that the applied materials consistently achieve proper compaction with a low percentage of rebound and no visible "sag".
  - iv. Ensure that the installation equipment nozzle is held at the proper distance away from and as nearly perpendicular to the prepared sub-surface as the working conditions will permit to secure maximum material compaction with minimum rebound and no visible "sag".

- v. Follow a sequence routine that will fill corners with adequately compacted material applied at a maximum practicable layer thickness.
  - vi. Determine necessary operating procedures for placement in confined spaces, extended distances or around unusual obstructions where placement velocities and mix consistency may need to be adjusted.
  - vii. Direct the crew as to when to start and stop the flow of materials during installation and to immediately stop all work when material is not arriving uniformly at the nozzle.
  - viii. Insure that slough pockets are removed and prepared for installation of replacement material.
  - ix. Bring the installed materials to established finished elevations in a neat and timely manner and within established tolerances.
- f. Applicator's job foreman shall operate the mixing/placing equipment and direct the work of mixing crew personnel. Applicator's work crew shall also maintain proper line pressures throughout the mixing/placing equipment to ensure the necessary consistent nozzle velocity. Applicator's work crew shall further see that all material fed to the nozzle is uniformly fed through this equipment.

#### Equipment

- a. Equipment shall be of spray type and approved by the material manufacturer. Alternate equipment may be utilized provided it meets the performance requirements of the specification. All equipment must be kept in operating condition and good repair.

#### Surface Preparation

- a. Ensure all sub-surfaces are clean and free of laitance, loose material, residue and all existing coating and lining materials. See Section 4.4 for Inflow and Infiltration Prevention. For detailed explanation of the required surface preparation see ACIRAP-3 "Spall Repair by Low Pressure Spraying" page 2. ACE 546R "Concrete Repair Guide", chapter 2 also provides a good reference for important considerations for repairing concrete surfaces using mortar.
- b. Sub-surfaces shall be thoroughly saturated with water prior to the application of the lining materials. In no instance shall shotcrete be applied in an area where running water exists. It

is the intent of this specification that the existing surface be saturated and free of any running water just prior to installation – or SSD, “saturated surface dry condition.” To achieve this condition it may be necessary to presoak the sub-surface for at least 24 hours.

Operations

- a. The Contractor shall provide all equipment necessary to individually gauge, control, and monitor the actual amounts of all component materials necessary to complete the lining installation. This type of equipment and methods used to gauge, control, and monitor component materials shall be subject to approval by the Engineer and Manufacturer.
- b. All lining materials shall be thoroughly mixed by mechanical means to ensure all agglomerated particles are reduced to original size or removed prior to placement into the application equipment (i.e. the hopper). Each batch of material should be entirely discharged before recharging with fresh material. Mixing equipment shall be cleaned at regular intervals to remove all adherent materials.
- c. The addition of water to the mix shall be in strict accordance with the Manufacturer’s recommendations.
- d. Re-mixing or tempering shall not be permitted. Rebound materials shall not be reused.

Protection of Adjacent Surfaces

- a. During progress of the work, adjacent areas or grounds which may be permanently discolored, stained, or otherwise damaged by dust and rebound material, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing as the surroundings permit.

Inflow and Infiltration Prevention

- a. If inflow or infiltration is observed within the structure after surface preparation is complete, a rapid setting crystalline enhance hydraulic cement product specifically formulated for infiltration control shall be used to stop minor infiltration flows in accordance with the manufacturer’s recommendations. The material shall meet the following strength requirements:

Compressive Strength (ASTM C597B)	600 psi	(24 hours)
	1,000 psi	(7 days)
Bond Strength (ASTM C321)	30 psi	(1 hour)
	80 psi	(1 day)

- b. The material shall be Preco Plug, Octocrete, Burke Plug or Engineer approved equal. Where infiltration flows are more severe, pressure grouting may be required. The material for pressure grouting shall be AvantiA-220, DeNeef or Engineer approved equal in accordance with the manufacturer's written instructions.
- c. All materials, labor, equipment, and incidentals required to correct inflow and infiltration conditions will be considered incidental to rehabilitation.

Application of Materials

- a. Lining material shall not be applied to a frozen surface or to a surface that may freeze within 24 hours of application. Frozen conditions shall be defined as ambient temperatures of 32 degrees Fahrenheit or below.
- b. Sequence of application may be from bottom to top or vice versa if rebound is properly removed.
- c. Application shall be from an angle as nearly perpendicular to the surface as practicable, with the nozzle held at least 1 foot from the working sub-surface (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.
- d. Application shall be suspended if:
  - i. Air velocity separates the cement from the aggregate at the nozzle.
  - ii. Ambient temperature approaches freezing and the newly placed SewperCoat cannot be protected and insulated.

The time interval between successive layers of material application must be sufficient to allow "tackiness" to develop but not final set. If final set does occur, this surface shall be prepared in accordance with Sections 4.1.1 of this document.
- e. Construction joints within a manhole shall be avoided. In the event a construction joint is necessary and approved by the Engineer, it shall be sloped off a thin, clean, regular edge, at a 45-degree angle. Prior to placement of the adjoining materials, the sloped portion and adjacent applied material shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.
- f. Nozzleman shall bring the material to an even plane and to well-formed corners.

- g. After the body coat has been place, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with additional material to insure a true, flat surface in accordance with Section 4.5.5 of this document
- h. For manhole applications, the recommended thickness of SewperCoat shall be a ½-inch cover over all surfaces, unless substrate conditions and other factors require additional thickness. For other larger structures (lift stations, wet wells, treatment plant structures, etc.), the recommended thickness of SewperCoat shall be a 1-inch cover over all surfaces, unless substrate conditions and other factors require additional thickness.

### Curing

If the material has been applied and furnished in accordance to the specifications, and it has been determined that the environment is not moist enough for natural curing, the contractor will be required to apply a curing compound to all coated surfaces. Curing compound shall meet the requirements of ASTM C309 and have the approval of the lining material Manufacturer and the Engineer prior to use.

Moist curing may also be used in lieu of curing compound. If moist curing is selected, it should be implemented just after the notice of uniform heat generated of the installed lining. Moist curing can consist of the use of soaker hoses, water sprinklers, or vapor/misting machines. Regardless of delivery method, moist curing should continue for a minimum of 18 hours.

## 2.6 MANHOLE STEPS

- A. Plastic manhole steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be driven into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.
- B. No steps shall be aligned over the flow channel. Step spacing shall be 16” as shown the Standard Detail Drawing.

## 2.7 MANHOLE RISERS

- A. Manhole risers (adjusting rings) 6” to 10” height shall be concrete.
- B. Manhole risers 2” to 4” height shall be high density polyethylene as manufactured by Ladtech, Inc.

## PART 3 - EXECUTION

### 3.1 MANHOLE BASES

#### A. General

1. Manholes shall be constructed at the locations shown on the Design Drawings.
2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.
3. Perform Sitework as per the requirements of Specifications Sections 02050, 02110, 02220, and 02222.
4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.
5. The bases shall be placed directly on an 8-inch to 12-inch deep pad (compacted thickness) of pipe bedding material as specified in section 02220, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.
  - a. The excavated soils shall be replaced with an appropriate Structural Backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.
6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the OWNER.
7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.
8. Compacted backfill as specified on the Design Drawings or section 02220 shall then be placed above the compacted bedding material up to finished grade.

#### B. Pre-Cast Bases

1. The OWNER reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the OWNER determines the products unsuitable for the OWNER'S installation.
2. Pre-Cast bases shall be used in lieu of doghouse manholes where flow permits, as determined by the ENGINEER.

- C. Cast-in-Place Bases
  - 1. Cast-in-Place Bases shall be used when installing a doghouse manhole over an existing sewer or as approved by the ENGINEER.
    - a. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid as specified in 3.1.A.5.
  - 2. The base shall be cast monolithically to an elevation at least 12 inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed.
    - a. Base thickness shall be as per 2.1.B.1.
    - b. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected.
    - c. Connections for sewer pipes shall conform to SD1's standard detail.
    - d. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components.
    - e. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface.
    - f. Raised or rough joint finishes will not be accepted.

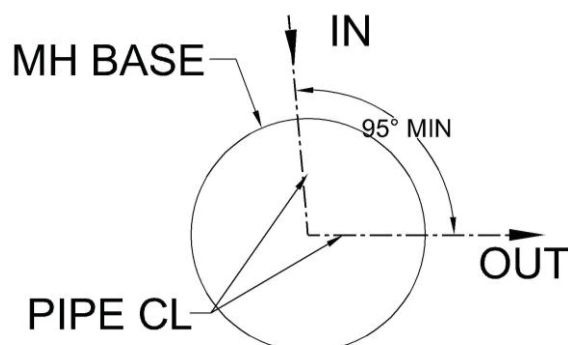
### 3.2 PRECAST MANHOLE SECTIONS

- A. Set sections vertical with steps and sections in true alignment.
- B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.

### 3.3 MANHOLE CHANNELS

- A. All invert channels through manholes shall be constructed of 4000 psi concrete.
- B. The flow line (channel) and benches shall be cast separately from the floor and side wall at the place of manufacture, unless otherwise approved by SD1.
- C. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered.
- D. Benches shall be built up to the heights shown or as ordered and given a uniform wood float finish.
- E. Care shall be taken to slope all benches for proper drainage to the invert channel.

- F. All flow channel angles between any new incoming pipe and new outgoing pipe shall be at least 95 degrees in the direction of flow as seen in the figure below. For any pipe with velocities exceeding 5 ft/s consult SD1 for the required angle or for the need of an oversized manhole.



### 3.4 GRADE RINGS

- A. Grade rings shall be used for all precast and masonry manholes to adjust height of manhole frame casting where required.
1. Grade rings shall be a maximum of 10 inches in height, constructed on the roof slab or cone section on which the manhole frame and cover shall be placed.
  2. The height of the grade ring shall be such as is necessary to bring the manhole frame to the proper grade.
  3. One piece precast concrete rings shall be used for grade adjustment greater than six (6) inches and up to ten (10) inches in height. Rings shall be set concentrically on top of the cone section or top slab if used.
  4. High density polyethylene risers shall be used for grade adjustment from two (2) inches to a maximum of six (6) inches in height. Rings shall be set concentrically on top of the cone section or top slab if used.
  5. All grade rings shall be sealed using two rows of butyl rubber sealant.
- B. The casting frame shall be installed on the riser as previously described with four (4) five-eighths (5/8) inch diameter stainless steel bolts extending through the riser, grade rings, and into the cone section or top slab.
1. The riser and cone may also be drilled with four (4) equally spaced five-eighths (5/8) inch diameter holes and four (4) No. 5 steel reinforcement bars installed and left flush with the riser top to prevent lateral movement and the casting frame bolted to the riser as previously described.
- C. High Density Polyethylene Manhole Adjusting Rings shall be used to adjust up to a maximum of six (6) inches.

### 3.5 PIPE CONNECTIONS TO MANHOLES

- A. A flexible pipe-to-manhole joint connector shall be used for joining piping to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material and be as specified herein.
  - 1. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
  - 2. If the slope of the incoming sewer exceeds 26% from the horizontal, a fitting shall be used outside the manhole wall to facilitate a more perpendicular connection to the manhole wall. The use of this fitting is to be evaluated on a case by case basis by sd1 engineers.
- B. All pipe connections to manholes shall match crowns. If matching crowns is not possible, a drop manhole may be approved by SD1.
- C. All drop manholes shall be approved by SD1. Drop manholes may be acceptable under the following conditions:
  - 1. If the slope of the influent sewer is greater than or equal to five (5) percent, SD1's drop connection detail 114 shall be followed. All other influent sewer slopes and drop connections will be evaluated on a case by case basis.
  - 2. All other drop manhole requests shall be approved on a case by case basis including but not limited to pipe realignments, connections to existing manholes, etc.

NOTE TO DESIGN ENGINEER: SD1 prefers matching crowns for sewer connections; however, depending upon depth of the sewer, drop manholes will be evaluated. Contact SD1 to discuss the details of the design for the project.

  - 3. If the total height of the drop is greater than sixteen (16) feet, a Vortex assembly shall be used. See Section 2.8.
- D. Slide manholes shall not be used.

### 3.6 CONNECTIONS TO EXISTING MANHOLES

- A. Perform by core drilling in accordance with section 01045.
- B. A flexible pipe-to-manhole joint connector shall be used for joining new piping to existing manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of

a size specifically designed for the pipe size and material and be as specified herein.

1. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
- C. The flow channel and bench for the new connection shall be constructed onsite or the existing flow channel and bench modified to accept the new piping.
- D. New connections to existing manholes need to be greater than ninety (90) degrees to the existing flow channel in the direction of the flow.
- E. Where new flows joining an existing eight (8) inch sewer that is flowing half pipe or greater, or the exiting pipe is twelve (12) inches or greater, an oversized manhole shall be installed to allow a smooth, sweeping flow transition. Consult SD1 for required manhole diameter.
- F. Perform all connections in accordance with Parts 3.9 and 3.11 of this section.

### 3.7 DOGHOUSE MANHOLES

For joining new pipe to existing pipe, refer to Item 3.1.B.2 of this section for requirements. Doghouse manholes shall only be used for connections to sewer mains with high flows, as determined by the ENGINEER. Doghouse manholes must be approved by SD1. For applications using doghouse manholes, refer to Item 3.1.C of this section and SD1 Standard Detail No.106 for requirements.

### 3.8 INTERIOR LINING

Any concrete manhole designated to be lined on the Design Drawings must have **Type 1 - Cured-in-place PVC composite liner, Type 2 – SPECTRASHIELD Liner System, Type 3 – Duraplate 100 Liner System, or Type 4 - SewperCoat.** Epoxy Resin manholes can also be used in lieu of lined manholes as a Deduct Alternate (see Section 2.2).

- A. Cured-in-place PVC Composite Liner:
1. Description of Work
    - a. This work shall include the furnishing of all labor, materials, and equipment for the installation of a cured-in-place PVC composite liner within a new sanitary sewer manhole.
    - b. The manhole liner shall be manufactured to the shape of the manhole. The fibrous portion of the liner shall be saturated with a modified epoxy resin, then pressurized and cured in-place.

- c. A removable inflation bladder shall be pressurized between ½ - 5 pounds per square inch. The bladder will be removed upon completion of the curing.
  - d. The exposed surface of the liner shall be white PVC.
2. Liner Performance Requirements
- a. Liner shall be of the type that allows lining of a concentric, eccentric or flat top manhole without removing the manhole ring and top section or corbel.
  - b. The liner shall be installed and cured in place via controlled curing by heat and pressurization in the manhole to complete the curing process.
  - c. The lining of the manhole shall result in a monolithic structure to the shape and contour of the existing manhole. The liner shall be installed and bond to the interior manhole substrate and be completely watertight, and free of any joints or openings other than pipe inlets, outlets and the cover frame opening.
  - d. Where indicated on the manhole schedule, the lining shall be designed with independent structural hoop strength for full height hydrostatic pressure as if the liner were a secondary vessel inside the existing manhole. The manufacturer shall design adequate liner thickness into the system with or without additional fiberglass layers.
  - e. All lined manholes shall have lined inverts. Plug the pipes entering the manhole and line the flow channel to the edge of the pipe. Trim all pipe openings and seal trimmed edges with a coating of epoxy mastic.
3. Preparation
- All surfaces of the manhole shall be cleaned with a high-pressure water-jet sprayer with an operating pressure of at least 3,500 psi. Pressure wash the manhole to remove all dirt, grease, sand, and surface contaminants on the wall and floor leaving a clean damp surface.
4. Liner Installation
- a. Installation shall be by an installer that is qualified by the liner manufacturer. The Contractor shall include the furnishing of all materials, equipment, tools, and labor as required for the rehabilitation of the manholes selected, including the installation of the interior liner.
  - b. The installation of the approved liner system shall be in strict accordance with the manufacturer's instructions. This shall include the preparation, installation, inflation, curing, and finishing operations, required for the completion of the manhole lining process.
  - c. All safety rules and regulations, applicable laws, and

insurance requirements shall be observed in storing, handling, use, and application of the liner materials, resins, and any solvents.

- d. Ventilation shall be provided to the workers at all times.
5. **Warranty**  
The CONTRACTOR shall warrant to the OWNER in writing the installation, fabrics, and resins to be free of defects in workmanship and materials for a period of ten years.

**B. SPECTRASHIELD Liner System**

The applicator of the SpectraShield liner system shall be trained and certified by the manufacturer for the handling, mixing, application and inspection of the liner system as described. To ensure total unit responsibility, all materials and installation thereof shall be furnished and coordinated with/by one supplier/applicator who turnkeys the work and assumes full responsibility for the entire operations.

- 1. **Inspection**
  - a. Applicator shall take appropriate action to comply with all local, state and federal regulations including those set forth by OSHA, EPA, the Owner and any other applicable authorities.
  - b. Prior to conducting any work, perform inspection of structure to determine need for protection against hazardous gases or oxygen depleted atmosphere and the need for flow control or flow diversion.
  - c. Submit plan for flow control or bypass to owner/engineer for approval prior to conducting the work.
  - d. New Portland cement structures shall have endured a minimum of 28 days since manufacture prior to commencing installation of the liner system.
- 2. **Description of Work**
  - a. This work shall include the furnishing of all labor, material, and equipment for the installation of SpectraShield liner system within a new sanitary sewer manhole.
- 3. **Surface Preparation**
  - a. Conduct surface preparation program to include monitoring of atmosphere for hydrogen sulfide, methane, low oxygen or other gases, approved flow control equipment, and surface preparation equipment.
  - b. Surface preparation methods may include high pressure water cleaning, hydro blasting, abrasive blasting, grinding, detergent water cleaning and shall be suited to provide a surface compatible for installation of the liner system.
  - c. Surface preparation method shall produce a cleaned, abraded

- and sound surface with no evidence of laitance, loose concrete, brick or mortar, contaminants or debris, and shall display a surface profile suitable for application of liner system.
- d. After completion of surface preparation, perform the seven point check list, which is the inspection for:
    - 1. Leaks
    - 2. Cracks
    - 3. Holes
    - 4. Exposed Rebar
    - 5. Ring and Cover condition
    - 6. Invert Condition
    - 7. Inlet and Outlet Pipe Condition
  - e. After the defects in the structure are identified, repair all leaks with a chemical or hydraulic sealant designed for use in field sealing of ground water. Severe cracks shall be repaired with a urethane based chemical sealant. Product to be utilized shall be as approved by owner/engineer prior to installation. Repairs to exposed rebar, defective pipe penetrations or inverts, etc. shall be repaired utilizing non-shrink grout or approved alternative method.
4. Material Installation
- a. Application procedures shall conform to recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety and spray equipment.
  - b. Spray equipment shall be specifically designed to accurately ratio and apply the liner system.
  - c. Application of multi-component liner system shall be in strict accordance with manufacturer's recommendation. Final installation shall be a minimum of 500 mils. A permanent identification and date of work performed shall be affixed to the structure in a readily visible location.
  - d. Provide final written report to owner/engineer detailing the location, date of report, and description of repair.
5. Post-Construction Inspection
- a. Final liner system shall be completely free of pinholes or voids. Liner thickness shall be the minimum value as described herein.
  - b. Visual inspection shall be made by the Owner/Engineer. Any deficiencies in the finished liner system shall be marked and repaired according to the procedures set forth by Manufacturer.
  - c. The sewer system may be returned to full operational service as soon as the final inspection has taken place.

### 3.9 STUBS FOR FUTURE CONNECTIONS

- A. Installation of stubs for future connections shall be evaluated on a case by case basis and approved by SD1. If stubs are approved, PVC, ductile iron, or fiberglass pipe stubs with approved watertight plugs shall be installed in manholes. SD1 requires that future connections to existing manholes be cored and the benching modified to accept the new connection. Where pipe stubs, sleeves or couplings for future connections are shown or ordered, CONTRACTOR shall provide all materials and work for their construction.
- B. If stubs are approved by SD1, stubs out of manholes shall be a two (2) to five (5) foot stick of pipe with sealed caps. When future connections are made to these manholes, the stubs shall be removed and a full stick of pipe shall be installed at the proper slope.
- C. Where connections are made to existing manholes installed after May 15, 2000, the existing manhole shall be vacuum tested prior to the connection being made. If the manhole is vacuum tested prior to alterations and fails, it is the responsibility of SD1 to repair or replace the manhole. If the manhole passes the vacuum test prior to connection, but fails the vacuum test after the connection is made, then the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

If the CONTRACTOR fails to vacuum test the manhole prior to any connections being made, and the manhole fails the vacuum test after the connection, the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

- D. If the connection to an existing manhole is cored, the connection shall be booted and the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.
- E. If the elevation or grade of an existing manhole is altered, the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

### 3.10 GRADING AT MANHOLES

- A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.
  - 1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.
  - 2. Manholes in wooded or other inaccessible areas shall be installed

- twelve (12) inches above the final grade.
3. Manholes in cultivated fields, hay fields and pastures shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.
- B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.
- C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

### 3.11 MANHOLE WATERTIGHTNESS

- A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails a visual leakage inspection and/or vacuum testing, SD1 will consider the manhole defective and the Contractor shall replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the Owner. No leak repairs shall be performed without the ENGINEER'S approval.
- B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by OWNER. Manholes not subject to vacuum testing must be in writing from OWNER. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the OWNER, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the Owner.
- C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:
1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
  2. Drop connections shall be installed prior to testing.
  3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
  4. The manholes shall be backfilled and finished to design grade prior to

- test.
- 5. Test pressure requirements of ASTM C-923 shall be met.

D. Test Procedure:

- 1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.
- 2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
- 3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.
- 4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.
- 5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

<u>Manhole Depth</u>	<u>Time (Minutes)</u>		
	<u>4' Diameter</u>	<u>5' Diameter</u>	<u>6' Diameter</u>
20 Feet or Less	1	2	3
20.1 to 30 Feet	2	3	4

Note: Consult SD1 on manhole diameters larger then six (6) feet.

- 6. If a manhole fails the vacuum test, SD1 will consider the manhole defective and the CONTRACTOR shall replace the manhole and/ or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the Owner. No repairs shall be made to the manhole unless approved by the ENGINEER.
- 7. All temporary plugs and braces shall be removed after each test.
- 8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

+ + END OF SECTION + +

SECTION 02610

PIPE AND FITTINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. CONTRACTOR shall provide all labor, materials, equipment, incidentals, and services as shown, specified, and required for furnishing, installing, and testing all buried piping, fittings, and specials specified herein. Piping herein specified includes force main & gravity sewer. Refer to the pipe material schedule shown below to determine which pipe materials are acceptable for each application. Remove and replace all existing piping that interferes with installation of new pipe or structures or that is damaged by new installations in a manner approved by the ENGINEER.

Type	Size	Depth	Acceptable Materials
Aerial	Any		Ductile Iron; PVC SDR 35 inside casing pipe
Gravity	Any	Less than 20'	PVC SDR 35; Fiberglass Polymer Mortar Pipe SN 46
	Any	20.1' to 30'	PVC SDR 26; Ductile Iron; Fiberglass Polymer Mortar Pipe SN 72
	Any	30.1' or greater	Fiberglass Polymer Mortar Pipe; Ductile Iron
Horizontal Directional Drill	Any	Any	HDPE ; Ductile Iron; Restrained Joint PVC C-900
Force Main	Any	Any	HDPE ;Ductile Iron ; PVC C-900

**Note:** Pipe selected shall be designed for the cover and loading requirements to each project. Design calculations for pipe wall thickness and structural design shall be provided by the ENGINEER, as requested by SD1. Restrained joint calculations for force mains shall be provided for all projects.

Depth is based on maximum cover between structures or manhole runs. Pipe shall be the same thickness between structures or manholes.

- B. The Work includes, but is not limited to, the following:
1. Piping beneath structures.

2. Supports and restraints,.
3. Pipe encasements.
4. Work on or affecting existing piping.
5. Testing.
6. Cleaning and disinfecting.
7. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other Work required to complete the buried piping installation.
8. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the Section 15100.
9. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping work required, beginning at the outside face of structures or structure foundations and extending away from structure.

- C. Review installation procedures under other Sections and other contracts and coordinate with the work that is related to this Section.

## 1.2 RELATED WORK

1. Section 02606 - Manholes.
2. Section 02220, Excavation and Backfill.
3. Section 02710, Drainage Structures.
4. Section 03300, Cast-In-Place Concrete.
5. Section 09900, Painting.
6. Division 15, Sections on Piping, Valves and Appurtenances.
7. Section 15052, Exposed Piping Installation.
8. Section 15100, Valves and Appurtenances.
9. Section 15121, Wall Pipes, Floor Pipes and Pipe Sleeves.
10. Section 15122, Piping Specialties.
11. Section 15140, Pipe Hangers and Supports.

## 1.3 LIMITATIONS

All existing piping as shown on the Design Drawings is based on the best information available, but SD1 and ENGINEER makes no guarantees as to the accuracy of the locations or type of piping depicted. All new piping which ties into existing lines must be made compatible with that piping. So that piping conflicts may be avoided, CONTRACTOR shall open up his trench well ahead of the pipe laying operation to confirm exact locations and sizes of existing piping before installing any new piping. CONTRACTOR shall provide all fittings and adapters necessary to complete all connections to existing piping as approved by SD1. All costs associated with alignment adjustments on new piping to tie into existing piping shall be borne by CONTRACTOR. No additional costs will be paid by SD1.

#### 1.4 QUALITY ASSURANCE

Requirements of Regulatory Agencies:

- A. Comply with requirements of UL, FM and other jurisdictional authorities, where applicable.
- B. Refer to the General and Supplementary Conditions regarding permit requirements for this Project.

#### 1.5 REFERENCES

Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

- A. AWWA C104, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- B. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
- C. AWWA C110, Standard for Ductile-Iron and Gray-Iron Fittings, 3 In.-48 In. (76 mm-1,219 mm), for Water.
- D. AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- E. AWWA C115, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- F. AWWA C150, Standard for Thickness Design of Ductile-Iron Pipe.
- G. AWWA C151, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- H. AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
- I. AWWA C606, Grooved and Shouldered Joints.
- J. AWWA C800, Underground Service Line Valves and Fittings.
- K. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
- L. AWWA M23, PVC—Design and Installation

- M. ASTM A 27, Standard Specification for Steel Castings, Carbon, for General Application.
- N. ASTM A 82, Standard Specification for Steel Wire, Plain for Concrete Reinforcement.
- O. ASTM A 185, Welded Steel Wire Fabric for Concrete Reinforcement.
- P. ASTM A 496, Deformed Steel Wire for Concrete Reinforcement.
- Q. ASTM A 497, Steel Welded Wire Fabric, Deformed for Concrete Reinforcement.
- R. ASTM A 1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- S. ASTM A 615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- T. ASTM C 14, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- U. ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- V. ASTM C 118, Concrete Pipe for Irrigation or Drainage.
- W. ASTM C 150, Standard Specification for Portland Cement
- X. ASTM C 361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
- Y. ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- Z. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- AA. ASTM D 1238, Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.
- BB. ASTM D 1598, Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- CC. ASTM D 1599, Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- DD. ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

- EE. ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- FF. ASTM D 2122, Determining Dimensions of Thermoplastic Pipe and Fittings
- GG. ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- HH. ASTM D 2464, Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- II. ASTM D 2467, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- JJ. ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- KK. ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
- LL. ASTM D 3034, Bell and Spigot-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- MM. ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- NN. ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- OO. ASTM D 3262, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- PP. ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- QQ. ASTM D 3754, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- RR. ASTM D 4161 Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- SS. ASTM D 5685, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings.

- TT. ASTM F 437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- UU. ASTM F 439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- VV. ASTM F 441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- WW. ASTM F 493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- XX. ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- YY. ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers

## 1.6 SUBMITTALS

- A. In addition to the requirements of Section 01300, provide the following:
  - 1. Size, class and other details of pipe to be used.
  - 2. Full details of piping, specials, joints, harnessing, and connections to existing piping, structures, equipment and appurtenances.
  - 3. Laying schedules and detailed drawings in plan and profile for piping.
  - 4. Jacking and boring operation details, including size of jacking and receiving pits, method of shoring and dewatering, jacking machine information, casing pipe, spacers and end seals.
  - 5. Method to monitor vibration, movement, settlement, cracking of nearby structures from jacking and boring operation.
- B. Tests: Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.
- C. Certificates: Submit certificates of compliance with referenced standards.
- D. As requested by SD1, all pipe manufacturers that supply pipe for the project shall provide a detailed structural design taking in account the depth of burial, highway loads, bedding and backfill requirements, water elevation, soil conditions and installation procedures. All designs submitted shall have a Professional ENGINEER's stamp from Kentucky. Such design shall be received, reviewed, and approved prior to manufacture.
- E. As requested by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures. As requested by SD1, pipe manufacturer's representative shall visit job site to monitor progress of pipe

installation and shall notify in writing the CONTRACTOR and SD1 of any discrepancy, changes, or incorrect procedures that would prevent the pipe from performing as designed.

- F. Record Drawings: Submit record drawings in accordance with Section 01720 and Section 01721.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Refer to applicable Sections for material specifications.
- B. General:
  - 1. Marking Piping:
    - a. Clearly mark each piece of pipe or fitting with a designation conforming to those shown on the laying schedule.
    - b. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4 inches in diameter and larger.
    - c. Pipe and fittings smaller than 4 inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

### 2.2 DUCTILE IRON PIPE AND FITTINGS

- A. Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.
- B. Pipe Manufacturer's Experience and Field Services.
  - 1. All ductile iron pipe, fittings, and specials shall be fabricated, lined and coated by the pipe manufacturer. Minimum required experience shall include manufacture of a similar pipeline in length to this contract, of equal or larger diameter than the pipe to be provided with joints, lining, and coating suitable for the same or greater pressure rating specified herein, which has performed satisfactorily for the past 5 years.
  - 2. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience installing ductile iron pipe with joints, lining, and coating of the pipe to be provided.
  - 3. All ductile iron pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service

representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.

4. Each joint, including all restrained joints, shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the joint and the restraints are installed properly.
5. The pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
6. All costs for these services shall be included in the Contract Price.

C. Materials

1. Where ductile iron pipe is required, it shall conform to ANSI/AWWA C151/A21.51, Table 1 or Table 3. Pressure class 350 shall be used for all piping, unless otherwise shown on the drawings or specified. Fittings shall conform to ANSI/AWWA C110/A21.10, or ANSI/AWWA C153/A21.53, with a minimum working pressure rating of 350 psi. All fittings shall be suitable for a test pressure as specified herein without leakage or damage.
2. All buried pressure piping shall be push-on joint or mechanical joint. Restrained joint pipe shall be installed at the station locations shown on the Contract Drawings. All above ground piping or piping in vaults shall be flanged.
3. All gravity sewer piping shall be push-on joint or mechanical joint.
4. Push-on joints and mechanical joints shall be in accordance with ANSI/AWWA C111/A21.11.
5. Restrained joint pipe shall be fabricated to the lengths required as determined by the laying schedule to be submitted as specified herein. If deviations from the approved laying schedule are required in the field as approved by SD1 and ENGINEER and field-cuts are required, CONTRACTOR shall provide restraint on the field-cut piping using, EBAA Iron "Megalug" restrained joints as specified below.
6. Field cuts shall be minimized and will be limited to only locations approved by SD1 and ENGINEER, when no other alternative to using factory provided joint restraint exists. Use of field-lock, fast-grip, field flex-ring, TR-flex gripper ring, etc. gaskets for field-cut pipe shall not be allowed.

D. Joints

1. Certification of joint design shall be provided in accordance with ANSI/AWWA C111/A21.11-90, Section 4.5, Performance Requirements, as modified herein.
2. The joint test pressure for each type of joint used on this project shall be not less than 2 times the working pressure or 1-1/2 times the test pressure of the pipeline, whichever is higher. The same certification and testing shall also be provided for restrained joints. For restrained joints, the piping shall not be blocked to prevent separation and the joint shall not leak or show evidence of failure.
3. It is not necessary that such tests be made on pipe manufactured specifically for this project. Certified reports covering tests made on other pipe of the same size and design as specified herein and on the drawings and manufactured from materials of equivalent type and quality may be accepted as adequate proof of design.
4. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.

E. Material Schedule

Push-on Joints and Mechanical Joints	ANSI/AWWA C111/A21.11
Restrained Push-on Joints Positive locking segments and/or rings (4 inch through 64 inch)	American "Flex-Ring", or "Lok-Ring"; U.S. Pipe "TR Flex"; Clow Corp., "Super-Lock", without exception
Restrained Push-on Joints, (field-cut spigot) locking wedge type	EBA Iron "Megalug" Series 1700, without exception. Shall only be used in locations approved by the ENGINEER.
Restrained Mechanical Joints (Factory prepared spigot) (4 inch through 48 inch)	American "MJ coupled Joints"
Restrained Mechanical Joints (field cut spigot)	EBA Iron "Megalug" Series 1100, without exception. Shall only be used in locations approved by the ENGINEER.

Fittings	ANSI/AWWA C110/A21.1, or ANSI/AWWA C153/A21.53, all with minimum working pressure of 350 psi, and suitable for the test pressure based on the project design without leakage or damage.
Flanged Joints & Fittings	Ductile Iron, ANSI/AWWA C115/A21.5 suitable for the test pressure based on the project design without leakage or damage. Faced and drilled, ANSI B16.1 125-pound flat face. Threaded conforming to AWWA C115/A21.15.
Bolting	125-pound flat-faced flange: ASTM A 307, Grade A carbon steel hex head bolts and ASTM A563 Grade A carbon steel hex head nuts
Gaskets	<p>Restrained Push-on and Mechanical Joints: Synthetic rubber conforming to AWWA C111/A21.11. Natural rubber is not acceptable.</p> <p>Flanged: 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F., conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges, or specially designed gaskets with required properties per ANSI/AWWA C111/A21.11 to meet the test pressure rating. Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange.</p> <p>Gasket pressure rating to equal or exceed the system hydrostatic test pressure.</p>

Joint Lubricant	Manufacturer's standard
Tapping Sleeves	316 SS, with 316 SS body and bolting, and rubber sealing gasket, suitable for the test pressure specified herein. JCM Industries, Model JCM 452 or approved equal.
Polyethylene Encasement	Seamless, ANSI/AWWA C105/A21.5; LLD-8 mil or HDCL-4 mil

F. Lining and Coating Ductile Iron Pipe and Fittings

1. All buried ductile iron pipe and fittings shall have manufacturers outside standard asphaltic coating and ceramic epoxy lining inside, factory applied. Ceramic epoxy lining shall be Protecto 401 as manufactured by Vulcan Painters, Inc. of Birmingham, AL, or NovoCoat SP-2000W as manufactured by NovoCoat Protective Coatings, of Addison, Texas and as specified herein. Flange faces shall be coated externally with a suitable manufacturer's standard rust-preventative compound.
2. Application of Lining  
The interior of the pipe exposed to liquids and gases shall be blasted and cleaned to remove all loose oxides and rust. After cleaning, the lining material shall be applied to yield 40 mils for the complete system using a centrifugal lance applicator. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate. The compound shall not be applied when the substrate temperature is below 40 degrees F., or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film.
3. Lining material  
The material shall be a two component epoxy with the following minimum Requirements:
  - a. A permeability rating of 0.0 perms when measured by ASTM E96-66, Procedure A. Duration of test - 6 weeks.
  - b. A direct impact resistance of 125 inches-pounds with no cracking when measured by ASTM-D-2794.
  - c. The ability to build at least 50 mils dry in one coat.
  - d. The material shall be recoatable with itself for at least seven days with no additional surface preparation when exposed to direct summer sun and a temperature of 90 degrees F.
  - e. The material shall contain at least 20% by volume of ceramic quartz pigment.
  - f. A test and service history demonstrating the ability of the material to withstand the service expected.

4. Inspection
    - a. All pipe shall be checked for thickness using a magnetic film thickness gauge.
    - b. All pipe shall be pinhole detected with a non-destructive 2,500 volt test.
    - c. Each pipe joint shall be marked with the date application of the lining system and with its numerical sequence of application of that date.
    - d. Each requirement of 3. above must be certified by the material supplier.
  5. Field Cuts
    - a. All manufacturer's procedures and recommendations shall be followed when making field cuts. Note proper field preparations and curing time of the coating.
- G. 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. If requested, three (3) copies of such instructions shall be delivered to the ENGINEER at start of construction.
- H. Encasement
1. Polyethylene encasement shall be provided for all buried ductile iron pipe, including all straight pipe, bends, tees, wyes, adapters, closure pieces, field restraint devices, valves and other fittings or specials, in accordance with ANSI/AWWA C105/A21.5, Method A. Preparation of the pipe shall include, but not be limited to: removing lumps of clay, mud, cinders, etc., prior to installation.
  2. Where ductile iron pipe is also embedded or encased in concrete or within a casing pipe, the polyethylene encasement shall be installed over the ductile iron pipe prior to concrete placement and in conjunction with installation in the casing pipe.
  3. The pipe shall be wrapped with 8-mil thickness polyethylene tube wrap, using the recommended minimum flat tube widths for the specified pipe sizes. The polyethylene tube wrap shall be of virgin polyethylene as produced from DuPont Alathan resin or equal.
  4. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of 2-inch wide plastic backed adhesive tape. The tape shall be Polyken Number 900, Scotchrap Number 50, or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film.
  5. The polyethylene film supplied shall be clearly marked at a minimum of 2-ft along its length, containing the following information:

- a. Manufacturer's name or trademark
- b. Year of Manufacture
- c. ANSI/AWWA C105/A21.5
- d. Minimum film thickness and material type (LLDPE or HDCLPE)
- e. Applicable range of nominal pipe diameter size(s)
- f. Warning--Corrosion Protection--Repair any Damage

### 2.3 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (GRAVITY LINES)

#### A. Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping – Schedule Rated Pipe:

- 1. Pipe and Fitting Material:
  - a. Standard: ASTM D 1784.
  - b. Type: Type I, Grade 1, rigid (12454-B).
- 2. Pipe:
  - a. PVC:
    - 1) Standard: ASTM D 1785.
    - 2) Designation: PVC 1120.
  - b. CPVC:
    - 1) Standard: ASTM F 441.
- 3. Joints:
  - a. General: Connect pipe by solvent cementing except where flanged or threaded fittings are required at expansion joints, valves, flow meters, equipment connections or otherwise shown or directed.
  - b. Flanged Joints:
    - 1) Use flanges joined to pipe by solvent cementing.
    - 2) Flange Drilling and Dimensions: Comply with ANSI B16.1.
    - 3) Flange Gaskets: Viton full face.
    - 4) Bolts, Nuts and Washers: Type 316 stainless steel.
    - 5) Provide washers on each face of the bolted connection.
  - c. Threaded Joints:
    - 1) Taper Pipe Threads: ANSI B2.1.
    - 2) Joint Preparation: Teflon tape.
    - 3) Use PVC dies for taper pipe threads.
  - d. Primer and Solvent Cement:
    - 1) Standard:
      - a) PVC: ASTM D 2564.
      - b) CPVC: ASTM F 493.
- 4. Fittings:
  - a. Socket-Type:
    - 1) PVC:
      - a) Standard: ASTM D 2467.
      - b) Designation: PVC I.
    - 2) CPVC:
      - a) Standard: ASTM F 439.
    - b. Threaded Type:
      - 1) PVC:

- a) Standard: ASTM D 2464.
  - b) Designation: PVC I.
  - 2) CPVC:
    - a) Standard: ASTM F 437.
- B. Polyvinyl Chloride (PVC) Piping – Gravity Sewer Pipe and Fittings:
- 1. Pipe and Fitting Material:
    - a. Standard: ASTM D 1784.
  - 2. Pipe and Fittings:
    - a. Standard:
      - 1) 4-inch through 15-inch diameter: ASTM D 3034.
      - 2) 18-inch through 27-inch diameter: ASTM F 679.
    - b. Thickness Class: As shown in item 1.1 this section.
  - 3. Joints:
    - a. Push On Joints: Connect pipe with integral wall bell and spigot joints. The bell shall consist of an integral wall section with a solid cross section rubber gasket, factory assembled, securely locked in place to prevent displacement during assembly. Joints shall be assembled in accordance with the pipe manufacturer's recommendations and ASTM D 3212.
    - b. Gaskets: Rubber gaskets shall be in compliance with ASTM F 477 and shall be suitable for the service specified.

#### 2.4 POLYVINYL CHLORIDE (PVC) PIPE – C900 Piping (FORCE MAINS)

- 1. This pipe shall meet the requirements of AWWA C900-75 for Polyvinyl Chloride (PVC) Pressure Pipe. The pipe shall be PVC 1120 pipe with cast iron pipe equivalent ODs. See Table 1 below for pipe material depth and pressure limitations.
- 2. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring which meets the laboratory performance of ASTM D3139. The bell section shall be designed to be at least as strong as the pipe wall.
- 3. Standard laying lengths shall be 20 feet  $\pm$  for all sizes. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

4. Fittings for all lines 4 inches in diameter or larger shall be restrained ductile iron and in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings.

5. Fittings for all lines less than 4 inches in diameter shall be PVC gasketed push on type or socket glue-type manufactured specifically for the pipe class being utilized. All socket-glue type connections shall be joined with PVC solvent cement conforming to ASTM D2564. Product and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility. Solvent cement joints shall be made up in accordance with the requirements of ASTM D2855.

6. Appropriate restraint shall be provided for all fittings. Fittings shall be restrained with EBAA Iron Mega-Lugs, without exception. Pipe joints on either side of the fittings shall also be restrained to the distance required by the restrained joint calculations with the appropriate EBAA Iron Mega- Lug. The appropriate restraints are listed below:

- Series 2000SV: MEGALUG Restraint for existing C900 PVC Pipe at DIP fitting
- Series 2500: MEGALUG Restraint for C900 at PVC fitting
- Series 2800: MEGALUG Restraint Harness for C900
- Series 2200: MEGALUG Restraint for C900 at DIP Mechanical Joint fitting

**TABLE -1 Pipe Material Depth and Pressure Limitations**

<b>Pipe Material</b>	<b>Minimum Depth of Bury<sup>1, 2</sup></b>	<b>Maximum Depth of Bury<sup>1, 2</sup></b>	<b>Pressure Class / Rating</b>	<b>Maximum Surge Pressure Capacity</b>
Pressure Class 350 – DIP	3 ft.	30 ft.	350 psi	450 psi
DR 25 – C900 PVC	3 ft.	10 ft.	165 psi. <sup>3</sup>	264 psi <sup>5</sup>
DR 18 – C900 PVC	3 ft.	20 ft.	235 psi. <sup>3</sup>	376 psi <sup>5</sup>
DR 14 – C900 PVC	3 ft.	30 ft.	305 psi. <sup>3</sup>	488 psi <sup>5</sup>

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe* brochure, *Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C900 PVC pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).
6. For C906 HDPE pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).

2.5 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Quality Assurance

1. Qualification of Manufacturers: Qualified manufacturers shall be firms regularly engaged in the manufacture of HDPE pipe and pipe fittings of the same size, type, and joint configuration specified, and whose products have been in satisfactory use for not less than five (5) years.
2. Heat Fusion Training/Certification: The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received training in the manufacturer’s recommended procedure not more than 12 months prior to commencing construction.

- a. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience in making heat fusion joints and installing HDPE pipe.
  - b. All HDPE pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The fusion pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
  - c. Each joint shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the pipe is properly fused.
  - d. The pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling, fusion, and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
  - e. All costs for these services shall be included in the Contract Price.
3. Interchangeability of Pipe and Fittings: Within Contract limits, pipe and fittings from different approved manufacturers shall not be interchanged.
  4. HDPE shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, percent carbon, (from pipe) dimensions and ring tensile strength.
  5. Materials used for the manufacture of HDPE pipe and fittings shall be PE3408 HDPE, meeting cell classification 345434C or 345434E per ASTM D 3350 and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D 1248; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute (PPI) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1,600 psi at 73° F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet those requirements.
  6. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to

- the full service pressure rating of the mating pipe. Directional fittings 16-inch IPS and larger such as elbows, tee, etc., shall have a plain end inlet for butt fusion and flanged directional outlets.
7. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the test required under ASTM D 3261.
  8. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small V-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.
  9. Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
  10. Joints between HDPE pipes and between HDPE fittings and pipes shall be fusion bonded as described in Section 3.5.
  11. The exterior of the HDPE pipe shall be color coded and striped in a way to identify the difference in pipe service, size and application.
  12. HDPE pipe shall be black.
  13. All piping used for horizontal directional drilling shall be permanently striped.
  14. Internal 316 stainless steel stiffeners as manufactured by JCM Industries, Inc., or approved equal shall be used at all locations where external connectors or restraint clamps are installed. MJ adapters as manufactured by Central Plastics Company or equal, with creation of positive restraint to the pipe from heat fusion of the adapter to the pipe, and creation of positive restraint at the connection through bolting of the backup ring to the MJ valve or fitting, can be used in lieu of the JCM internal stainless steel stiffeners and external restraint clamps.
  15. Except as noted in item 14 above, all mechanical connections shall be stiffened and restrained. Restraints shall be as manufactured by JCM Industries, Inc., or approved equal.
  16. External restraint clamps utilized for transition from ductile iron pipe to polyethylene pipe shall be as manufactured by JCM Industries, Inc., or approved equal. Restraints must be compatible with stiffeners and pipe. JCM restraints shall not be used with HDPE pipe in locations where test pressures will exceed 150 psi. In locations where HDPE pipe will have test pressures exceeding 150 psi, provide an MJ adapter as described in item 14 above.
  17. The Dimension Ratios (DR's) are shown on the table below:

### Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury <sup>1, 2</sup>	Maximum Depth of Bury <sup>1, 2</sup>	Pressure Class / Rating	Maximum Surge Pressure Capacity
DR 17 – HDPE	3 ft.	10 ft.	100 psi <sup>4</sup>	200 psi <sup>6</sup>
DR 13.5 – HDPE	3 ft.	15 ft.	128 psi <sup>4</sup>	256 psi <sup>6</sup>
DR 11 – HDPE	3 ft.	20 ft.	160 psi <sup>4</sup>	320 psi <sup>6</sup>
DR 9 – HDPE	3 ft.	25 ft.	200 psi <sup>4</sup>	400 psi <sup>6</sup>
DR 7.3 – HDPE	3 ft.	25 ft.	254 psi <sup>4</sup>	508 psi <sup>6</sup>

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe* brochure, *Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C900 PVC pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).
6. For C906 HDPE pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).

The DR’s shall be verified by the Design ENGINEER and the manufacturer for the laying and pressure conditions shown on the drawings, including full consideration of vacuum, with calculations submitted to SD1 for review. NOTE: Manufacturers who do not comply with this requirement will not be considered an equal. The CONTRACTOR shall be liable if the pipe fails or pulls apart. The minimum DR shown above shall be used unless a thicker wall DR is recommended by the manufacturer during his verification. For horizontal directional drilling (HDD), pipe installed at depths from 0’-15’ deep shall have a minimum DR 9 rating or

manufacturer's minimum recommended DR, whichever is more conservative. HDD pipe installed at depths greater than 15' shall also have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. **CONTRACTOR shall note that depending on the wall thickness of the pipe to be furnished, an increase in pipe size may be required to provide comparable internal diameter to ductile iron pipe.**

18. Mechanical joint ductile iron fittings for DIP sized HDPE pipe meeting all requirements of ANSI A211.11 (AWWA C111) may be used in lieu of HDPE pipe fittings. Restraints shall be Sur-Grip as manufactured by JCM Industries, Inc., or approved equal.
19. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.
20. HDPE pipe shall have OD of ductile iron pipe.
21. HDPE pipe shall be as manufactured by CP Performance Pipe, or equal.

## 2.6 FIBERGLASS REINFORCED POLYMER MORTAR (FIBERGLASS) PIPE AND FITTINGS (GRAVITY LINES)

- A. Fiberglass reinforced polymer mortar (fiberglass) pipe and fittings for gravity sewers shall conform to the requirements of ASTM D-3262, current approval, "Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe."
- B. Materials
  1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
  2. Glass Reinforcements: Chopped glass reinforcement fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins. Continuous circumferential glass reinforcement fibers, where utilized, shall be of grade ECR-glass with binder and sizing compatible with impregnating resins.
  3. Silica Sand: Sand shall be a minimum of 98% silica with a maximum moisture content of 0.2%.
  4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.
  5. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

C. Manufacture and Construction

1. Pipes: Manufacture pipe by a process that will result in a dense, non-porous, corrosion-resistant, consistent composite structure.
2. Joints: Unless otherwise specified, the pipe shall be field connected with fiberglass couplings that utilize elastomeric EPDM or REKA sealing gaskets as the sole means to maintain joint watertightness. The joints shall meet the performance requirements of ASTM D4161. Additionally, the joints shall be rated to a pressure of 80% of -14.7 psi as installed. Joints at tie-ins, when needed may utilize fiberglass, gasket-sealed closure couplings.
3. Fittings: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays. All fittings and couplings shall be pressure rated for a minimum of 50 psi.
4. End Coating: Protective spigot end resin coating shall be applied at the time of manufacture. CONTRACTOR shall similarly coat the ends of all field cut pipes if the wall of the pipe is completely de-aerated during the production process and glass and sand are not impregnated with 100% pure resin to form a wall that cannot be penetrated by water.
5. Fiberglass pipe shall be as manufactured by: Hobas Pipe USA, Inc.,, or approved equal.
6. For bury depths greater than 20 feet, CONTRACTOR shall comply with special trench construction requirements recommended by the manufacturer.

D. Dimensions

1. Diameters: The actual outside diameter of the pipe barrel shall be in accordance with ASTM D3262. The internal diameters of all pipes shall be as specified on the Contract Drawings for each pipe diameter.
2. Lengths: Pipe shall be supplied in nominal lengths of 20 feet. Actual laying length shall be nominal +1, -4 inches. At least 90% of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.
3. Wall Thickness: The minimum wall thickness shall be the required design thickness for the laying conditions. Manufacturer shall provide information in writing to SD1 per the submittal requirements.
4. End Squareness: Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/4".

E. Testing

1. Pipes: Pipes shall be manufactured and tested in accordance with ASTM D3262.
2. Joints: Joints shall meet the requirements of ASTM D4161.
3. Stiffness: As tested in accordance with ASTM D2412. Any fiberglass pipe run that exceeds 20 feet, but less than 30 feet, in depth to invert anywhere along the run length from one manhole or structure to a second manhole or structure shall be a minimum stiffness of 72 psi for the entire run.

- F. Customer Inspection
  - 1. SD1 or other designated representative shall be entitled to inspect pipes at the factory or witness the pipe manufacturing.
  - 2. Manufacturers Notification to Customer: Should SD1 request to see specific pipes during any phase of the manufacturing process, the manufacture must provide SD1 with adequate advance notice of when and where the production of those pipes will take place.
- G. Packaging, Handling, and Shipping shall be done in accordance with the manufacturer's instructions.

## 2.7 TRACER WIRE

- A. All pressure pipe shall have marking tape 6" wide. Marking tape for the force main shall be green with the words "Sanitary Sewer" installed approximately twelve (12) inches above the pipe and shall continue for the length of the pipe installation.
- B. All pipe for sanitary force mains shall be installed with a twelve (12) gauge solid copper (PVC coated) tracing wire taped to the top of the pipe every five (5) feet. No tracing wire length shall exceed fifteen hundred (1500) feet between air release valves and/or discharge manhole, where system becomes gravity, without terminating in a curb stop box marked with "Sewer". Tracing wire must run continuously through air release valves and made accessible from ground level. Sanitary force mains that end in a discharge manhole, at which point system becomes gravity, shall terminate tracing wire in a curb stop box next to the discharge manhole. Curb stop boxes shall not be located in pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by SD1. If splices are required, they shall be made with copper split bolt (IlSCO #1K-8 or approved equal) and taped with electrical tape. Tracer wire shall be tested to confirm it is functioning properly after installation.

## 2.8 PIPE COUPLINGS

The pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) stainless steel middle ring, of thickness and length specified, two (2) stainless steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. The couplings shall be assembled on the job in a manner to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc. The coupling shall be Dresser, Style 38, as manufactured by Dresser Manufacturing Division, Bradford, PA, or equal.

## 2.9 WYE BRANCH FITTINGS AND LATERALS FOR NEW CONSTRUCTION

- A. Tee or wye branch fittings shall be used for household or service connection lines to the sewer collector line. The fittings shall meet the requirements of the mainline pipe materials as specified herein. The wyes and tees shall be located as shown on the Contract Drawings or as directed by the ENGINEER. The wyes and tees shall be positioned as to require the least number of fittings per lateral connection. Regular wye connections shall be in accordance with Standard Drawing No. 120. Stack wye connections shall include vertical piping, elbows, wye, and concrete encasement in accordance with Standard Drawing No. 108. If a single sweep tee connection is used, the sweep must be in the direction of sanitary sewer main
- B. Inserta Tee pipe fittings are permitted as an alternate lateral tap connection in lieu of wye fittings on a case by case basis for new construction. Inserta Tee type shall be compatible for the pipe type be tapped. Contractor shall be responsible for supplying the proper Tee. Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawing 102.
- C. Tapping saddles shall only be used with the explicit approval of SD1 on a case by case basis.
- D. Lateral extensions shall be installed from the end of the regular or stack wye connection to the limit of easement or public right-of-way in accordance with Standard Drawing No. 120.

## 2.10 CONNECTIONS TO EXISTING SEWERS

- A. Connections to existing public sewers shall be made at the nearest wye or tee available on the public sewer. Connections to existing sewers where wyes or tees are not available shall be made by one of the following methods:
  - 1. Install a wye or tee branch fitting per the manufacturer's recommendations or an approved method by SD1.
  - 2. Inserta Tee Pipe Fittings: Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawings 102.
  - 3. Tapping Saddles: Tapping saddles shall only be used with the explicit approval of SD1 on a case by case basis.

## 2.11 JOINT RESTRAINERS AND APPURTENANCES

- A. General: Where new pipe is connected to the existing piping, consult SD1 for appropriate pipe connections.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. After being delivered alongside the trench, the pipe, fittings, and specials shall be carefully examined for cracks, soundness, or damage, or other defects while suspended above the trench before installation. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. Before each piece of pipe is lowered into the trench, it shall be thoroughly cleaned out. Each piece of pipe shall be lowered safely and separately in the trench. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe.
- B. The bell and spigot of the joint shall be thoroughly wire brushed and cleaned of dirt and foreign matter immediately prior to jointing. The contact surfaces shall be coated with the lubricant, primer or adhesive recommended by the manufacturer, and then the pipe shall be pushed together until the joint snaps distinctly in place. The pushing together of the pipe may be done by hand or by the use of a bar.
- C. Place pipe to the grades and alignment indicated, with a tolerance of one in 100 vertical and one in 500 horizontal, unless otherwise directed by the ENGINEER. Remove and relay pipes that are not laid correctly. Slope piping uniformly between elevations shown.
- D. Trenches shall be kept dry during pipe laying. Before pipe laying is started, all water that may have collected in the trench shall be removed. Ensure that ground water level in trench is at least 12 inches below bottom of pipe before laying piping. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete and protect and keep clean water pipe interiors, fittings and valves.
- E. All pipe shall be laid starting at the lowest point and proceed towards the higher elevations, unless otherwise approved by ENGINEER. Place bell and spigot pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
- F. When laying of the pipe is stopped, the end of the pipe shall be securely plugged or capped. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious material.
  - 1. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
  - 2. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.

3. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.
- G. Pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures prior to the start of the Work.
- H. Install piping as shown, specified and as recommended by the manufacturer. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from SD1 before proceeding.
- I. Deflections at joints shall not exceed 75 percent of the amount allowed by the pipe manufacturer.
- J. Field cut pipe, where required, with a machine specially designed for cutting piping. Make cuts carefully, without damage to pipe or lining, and with a smooth end at right angles to the axis of pipe. Cut ends on push-on joint shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.
- K. Touch up protective coatings in a satisfactory manner prior to backfilling. See pipe material section for specific requirements.
- L. Place concrete pipe containing elliptical reinforcement with the minor axis of the reinforcement in a vertical position.
- M. Laying Pipe and Service Laterals
  1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
    - a. Ductile Iron Pipe: AWWA C600, AWWA C105.
    - b. Concrete Pipe: AWWA M9, Concrete Pipe Handbook.
    - c. Thermoplastic Pipe: ASTM D 2774.
    - d. ASCE Manual of Practice No. 37.

### 3.2 PIPING INSTALLATION- GENERAL

- A. Excavation for Pipeline Trenches: Refer to Section 02220. Trenches in which pipes are to be laid shall be excavated to the depths shown on the Drawings or as specified by the ENGINEER. Minimum cover for all pipelines shall be 36 inches under non-traffic areas and 60 inches under traffic areas unless otherwise shown on the Drawings or approved by the ENGINEER. All trench excavations shall be inspected by ENGINEER prior to laying pipe. Notify ENGINEER in advance of excavating, bedding and pipe laying operations.
- B. Jointing: The types of joints described herein shall be made in accordance with the manufacturer's recommendations.

- C. Separation of Sewers and Potable Water Pipe Lines:
1. Horizontal and Vertical Separation:
    - a. Wherever possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers and service lines shall be separated horizontally by a clear distance of not less than 10 feet.
    - b. If local conditions preclude a clear horizontal separation of not less than 10 feet, the installation will be permitted provided the potable water main is in a separate trench or on an undistributed earth shelf located on one side of the sewer and at an elevation so the bottom of the potable water main is at least 18 inches above the top of the sewer.
    - c. Exception:
      - 1) Where it is not possible to provide the minimum horizontal and vertical separation described above, the potable water main must be constructed of cement lined ductile iron slip-on or mechanical joint pipe complying with the public water supply design standards of the governing agency. Sewer must be constructed of epoxy lined ductile iron slip-on or mechanical joint pipe complying with SD1's requirements. Both pipes shall be pressure tested in accordance with the requirements of the buried piping schedule, but in no case less than 150 psi, to assure watertightness before backfilling.
  2. Crossings:
    - a. Provide a minimum vertical distance of 18 inches between the outsides of pipes.
    - b. Center one full length section of potable water main over the sewer so that the sewer joints will be equidistant from the potable water main joints.
    - c. Provide adequate structural support where a potable water main crosses under a sewer to maintain line and grade.
    - d. Exceptions:
      - 1) See requirements in paragraph 3.2.C.1.c.(1) above.
      - 2) Encase either potable water main or sewer in a watertight carrier pipe that extends 10 feet on both sides of the crossing, measured perpendicular to the potable water main.
- D. Piping in close proximity to cathodic protection:
1. Where new metal piping is in close proximity to or crosses existing steel or Ductile Iron pipe confirmation if the existing piping has cathodic protection shall be performed. If existing piping is catholically protected, SD1 shall be consulted for direction.
- E. On steep slopes, take measures acceptable to ENGINEER to prevent movement of the pipe during installation. Permanent slope anchors shall be installed on all pipe

with slopes over twenty (20) percent. See the SD1's standard detail for Concrete Anchor Block. Consult with SD1 on spacing of the anchors.

- F. Where force mains parallel gravity sewers, fittings shall be provided to maintain 12-inches of separation between all pipes and manholes.
- G. Reaction Anchorage (Pressure Pipe Only):
1. All tees, Y-branches, bends deflecting 11-1/4 degrees or more, and plugs which are installed in buried piping shall be provided with proprietary restrained joint systems for preventing movement of the pipe and joints caused by the internal test pressure.
- H. Thrust Restraint
1. Provide thrust restraint on pressure piping systems where shown and specified.
  2. Thrust restraint for DIP shall be accomplished by means of restrained pipe joints.
  3. Thrust restraints shall be designed for the axial thrust exerted by the system design pressures as specified by the Design ENGINEER.
- I. Dewatering and Ground Water
1. Discharging of sediment laden groundwater or rainwater from excavations directly to watercourses or storm sewers is prohibited. Failure of the CONTRACTOR to comply with the requirements of this specification may result in SD1 issuing a stop work order or non-approval of pay estimates until the CONTRACTOR puts measures in place to comply with this specification. All costs associated with the stop work or non-approval of pay estimates shall be at the CONTRACTOR's sole expense.
  2. Pipe trenches and excavations for appurtenances shall be kept free from water during trench bottom preparation, pipe laying and jointing, pipe embedment and building of appurtenances in an adequate and acceptable manner.
  3. Where the trench or excavation bottom is mucky or otherwise unstable because of ground water, or where the ground water elevation is above the bottom of the trench or excavation, the ground water shall be lowered by means acceptable to the ENGINEER to the extent necessary to keep the trench or excavation free from water while the trench or excavation is in progress. The discharge of ground water from the trench or excavation area shall be by the methods specified below to natural drainage channels, gutters, drains, or storm sewers which will conduct the water away from the trench or excavation area. Means of diverting any surface water away from the trench or excavation area shall be taken and surface water prevented from entering the trench or excavation area.

4. Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during sub grade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.
5. All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations a minimum of 6 inches or more below the bottom of the excavation.
6. Surface water shall be diverted or otherwise prevented from entering excavations or trenches to the greatest extent possible without causing damage to adjacent property.
7. Groundwater and rainwater removed during dewatering shall be discharged onto undisturbed ground where vegetative cover exists or through sediment and erosion controls and allowed to flow overland to filter out any sediments before discharging to any drain, storm sewer, or watercourse specified above. No such flows are permitted onto exposed soils, stream banks, or other areas subject to erosion.
8. Where overland flow on existing undisturbed ground is not sufficient to adequately remove all sediment from dewatering operations prior to discharge to any drain, storm sewer, or watercourse, straw bale check dams, sediment capturing bags, or other means acceptable to SD1 or ENGINEER shall be used to remove the sediment from the water prior to discharge. The method of discharging ground water or rain water from the trench or excavation area shall be such as to not create any erosion of existing ground.
9. All discharge locations shall be approved prior to construction by the ENGINEER and OWNER.
10. CONTRACTOR shall take measures to prevent damage to properties, structures, sewers, and other utility installations and other work.
11. CONTRACTOR shall repair all damage, disruption, or interference resulting directly or indirectly from groundwater control system operations at no additional cost to SD1.
12. The CONTRACTOR shall maintain the components of the dewatering system and surface water erosion and sediment controls within the project site. Deficiencies identified during visual inspection by SD1, SD1 's

representatives, or the governing regulatory authority shall be remedied by the CONTRACTOR at no additional cost to SD1.

13. Dewatering system components shall be located where they will not interfere with construction activities adjacent to the work area.
14. The CONTRACTOR shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

#### J GROUND WATER BARRIERS

Where specified, continuity of bedding material shall be interrupted by low permeability groundwater barriers to impede passage of water through the bedding. Groundwater barriers for all pipelines shall be soil plugs of 3 feet in thickness, extending the full depth and width of the pipe bedding material in the trench, and spaced not more than 400 feet apart. The soil plugs shall be constructed from soil meeting ASTM D2487 classification GC, SC, CL, or ML, and compacted to 95 percent of maximum density at or near the optimum moisture content (ASTM D698).

#### K PIPE ENCASEMENTS

1. Concrete Encasement
  - a. Wherever pipe encasement is called for on the plans or ordered in by SD1, the CONTRACTOR shall construct the encasement as shown on the drawings or in accordance with SD1's standard drawings.
  - b. Support the pipe sections on oak blocks or other compressible blocks, being sure to keep the pipe sections on line and grade and then pour concrete, completely under each section, along each side and up to a point at least twelve (12) inches above the top of each section, making sure that all voids are filled. In lieu of blocks, the CONTRACTOR may use a bed of concrete, to initially support the pipe sections.
  - c. The minimum dimension of concrete under the pipe sections shall be six (6) inches and on each side of the sections shall be twelve (12) inches. This encasement shall be reinforced around the top and sides of the pipe as shown on the Contract Drawings for creek crossings and other locations. If the trench walls are nearly vertical from the bottom of the trench up to a point to which the encasement is to be poured, forms for forming the encasement may be omitted and the concrete poured to and against the trench walls. Where trench walls are not nearly vertical, proper forms shall be set for forming the encasement, unless otherwise called for by SD1. The space between the trench walls and any formed encasement shall be filled and compacted with approved pipe bedding or backfilling material.
  - d. Care shall be taken to assure that the pipe sections remain on line and

- grade during the placing of concrete and that the joints are not disturbed. Backfill shall not be placed for a minimum of six (6) hours after encasement is completed, unless otherwise approved by SD1.
- e. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.
2. Casing Pipe
- a. Whenever casing pipe is called for on the plans, the CONTRACTOR shall install a casing pipe of the size and of the material called for on the plans by means of jacking, boring, or trenching.
  - b. When the casing pipe is to be installed under a highway or railroad, and at other locations specifically designated on the Drawings, the method of installation shall be jacking or boring as specified in Section 02400, unless trenching is specifically allowed.
    - 1. For force mains inside casing pipe all pipe joints shall be restrained joint connections. Casing spacers or wood blocking shall be used to center the pipe in the casing. The annular space between the force main and casing pipe shall be completely filled with 500 psi or higher compressive strength grout.
    - 2. For gravity pipe inside casing pipe, casing spacers shall be used to center the pipe within the casing. The annular space does not have to be filled.
  - c. Casing Spacers- Include in casing pipe. Centered/Restrained Casing spacers shall be installed to position the carrier pipe within the center of the casing pipe. The required spacing and installation shall be per the manufacturer's recommendation, except that for PVC carrier pipe, a minimum of 3 spacers shall be installed on each length of pipe with a maximum 6 feet spacing between spacers. All spacers shall be 316 stainless steel as manufactured by Cascade Waterworks MFG Co., Advance Products and Systems (APS) or other approved equal. Casing spacers shall also be provided with height field-adjustment capability for installation of gravity sewer on a constant slope.
  - d. Casing pipe end seals shall be installed at each end of the casing pipe and shall consist of a proper sized rubber seal and attached to the carrier and casing pipe with stainless steel bands per the manufacturers recommendation. Casing pipe end seals shall be manufactured by Cascade Waterworks MFG Co., Advanced Products and Systems (APS) or other approved equal.

L Work Affecting Existing Piping

- 1. Location of Existing Piping:

- a. Locations of existing piping shown should be considered approximate.
  - b. CONTRACTOR shall determine the true location of existing piping to which connections are to be made, and location of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
  - c. Conform to applicable requirements of Division 1 pertaining to cutting and patching, and connections to existing facilities.
2. Taking Existing Pipelines Out of Service:
    - a. Do not take pipelines out of service unless specifically noted on the Drawings, or approved by SD1.
  3. Work on Existing Pipelines:
    - a. Cut or tap pipes as shown or required with machines specifically designed for this work.
    - b. Install temporary plugs to prevent entry of mud, dirt, water and debris.
    - c. Provide all necessary adapters, fittings, pipe and appurtenances required to complete the Work.
- M. Install service laterals per SD1's standard details and per the requirements specified in this specification,.
- N. Bedding and backfilling of pipeline trenches shall be in accordance with the requirements set forth in Section 02220 and as shown on SD1's trench compaction detail.
- O. Before final acceptance, the CONTRACTOR will be required to level all trenches or to bring the trench up to grade. The CONTRACTOR shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction.

### 3.3 DUCTILE IRON PIPE INSTALLATION REQUIREMENTS

- A. Jointing Pipe:
1. Ductile Iron Mechanical Joint Pipe:
    - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
    - b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
    - c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
    - d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.

- e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
- f. Insert bolts and hand tighten nuts.
- g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

<u>Pipe Size (inches)</u>	<u>Bolt Size (inches)</u>	<u>Range of Torque (ft-lbs)</u>
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling the joints, the last 8 inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned and all mud, debris, etc. removed and joint recesses wiped clean.
- b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
- c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
- d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
- e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured or otherwise damaged shall not be used.
- f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.

3. Proprietary Joints:

- a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe Incorporated, restrained joints, or other such joints shall be installed in strict accordance with the manufacturer's instructions.

B. Polyethylene Tube Wrap Installation

The polyethylene tube wrap shall be installed on ductile iron pipe in accordance with AWWA C105 and the following:

1. Pick up the pipe by a crane at the side of the trench using either a sling or pipe tongs, and raise the pipe about three feet off the ground. Slip a section of the polyethylene tubing over the spigot end of the pipe and bunch up, accordion fashion, between the end of the pipe and the sling. The tubing should be cut to a length approximately 4 feet longer than the length of the pipe.
2. Lower the pipe into the trench, seat the spigot end in the bell of the adjacent installed pipe and then lower the pipe to the trench bottom. A shallow bell hole shall be provided in the trench bottom to facilitate the wrapping of the joint.
3. Make up the pipe joint in the normal fashion.
4. Remove the sling from the center of the pipe and hook into the bell cavity and raise the bell end 3 or 4 inches to permit the polyethylene tubing to be slipped along the full length of the barrel. Enough of the tubing should be left bunched up, accordion fashion, at each end of the pipe to overlap the adjoining pipe approximately 2 feet.
5. To make the overlap joint, pull the tubing over the bell of the pipe, fold around the adjacent spigot and wrap with approximately three (3) circumferential turns of the 2-inch wide plastic adhesive tape to seal the tubing to the pipe.
6. The tubing on the adjacent pipe shall then be pulled over the first wrap on the pipe bell and sealed in place behind the bell using approximately three circumferential turns of the 2-inch plastic adhesive tape.
7. The resulting wrap on the barrel of the pipe will be loose, and it should be pulled snugly around the barrel of the pipe and the excess material folded over at the top, and held in place by means of 6-inch strips of the 2-inch wide plastic adhesive tape at intervals of approximately 3 feet along the pipe barrel.
8. Fittings, valves, hydrants, etc., shall be hand wrapped, using polyethylene film that is held in place with the plastic adhesive tape.
  - a. Bends, reducers, and offsets can be wrapped with the polyethylene tubing in the same manner as pipe.
  - b. Valves can be wrapped by bringing the tube wrap on the adjacent pipe over the bells or flanges of the valve and sealing with a flat sheet of the polyethylene passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.
  - c. Hydrants can be wrapped with polyethylene tubing slipped over the hydrant to encase the hydrant from the lead-in valve to the ground level of the hydrant. To provide drainage of the hydrant, it is necessary to cut a small hole in the film and insert a short pipe nipple to drain the water to the soil outside the film wrap.

- d. All fittings that require concrete backing should be completely wrapped prior to pouring the concrete backing block.

### 3.4 HDPE INSTALLATION REQUIREMENTS

#### A. Pipe Joining

1. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made using saddle fusion using only procedures that are recommended by the pipe and fittings manufacturer.
2. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets, of like outside diameter and wall thickness (SDR or DR). Butt fusion jointing between like diameters, but unlike wall thickness, shall not be permitted. Transitions between unlike wall thicknesses shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.
3. Heat-joining of HDPE pipe shall conform to applicable portions of AWWA C-906.
4. HDPE pipe and fittings shall be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining HDPE pipe or for joining HDPE pipe to another material. Mechanical couplings shall be fully pressure-rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall be used in lieu of fully restrained mechanical couplings.

#### B. Installation

1. On every day that butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion straps shall be cut out. The test strap shall be 12-inch (minimum) or 30 times the wall thickness in length with the fusion in the center, and 1-inch (minimum) or 1.5 times the wall thickness in width. Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
2. Installation shall be in accordance with ASTM D 2321, manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with all applicable safety codes and standards.
3. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In

no case shall the flanged bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer. At least one (1) hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft.-lbs. or as recommended by the manufacturer.

4. Pipe shall be laid on grade and on a stable foundation in accordance with Section 02220.
5. When lifting with slings, only wide fabric choker slings shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used.
6. CONTRACTOR shall be liable to correct any pipe installed off line or grade (whether by horizontal directional drilling or other means).

### 3.5 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE INSTALLATION REQUIREMENTS

#### A. Push-on Joints

1. Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
2. Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.

### 3.6 FIBERGLASS PIPE INSTALLATION REQUIREMENTS

A. Pipe Handling: Use textile slings, other suitable materials or a forklift. Use of chains or cables is not permitted.

#### B. Jointing:

1. Clean ends of pipe and coupling components.
2. Apply joint lubricant to pipe ends and elastomeric seals of coupling. Use only lubricants approved by the pipe manufacturer.
3. Use suitable equipment and end protection to push or pull the pipes together.
4. Do not exceed forces recommended by the manufacturer for coupling pipe.
5. Join pipes in straight alignment then deflect to required angle. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.

### 3.7 GENERAL TESTING REQUIREMENTS

#### A. General:

1. Test all piping.
2. All piping shall be tested prior to post-construction CCTV operations.
3. Notify SD1 at least 48 hours in advance of testing.
4. Conduct all tests in the presence of SD1.

5. Remove or protect any pipeline-mounted devices which may be damaged by the test pressure.
  6. Provide all apparatus and services required for testing, including but not limited to, the following:
    - a. Test pumps, bypass pumps, hoses, calibrated gauges, meters, test containers, valves and fittings.
    - b. Temporary bulkheads, bracing, blocking and thrust restraints.
  7. Provide air if an air test is required and power if pumping is required.
  8. CONTRACTOR shall provide fluid required for testing.
- B. Force Mains Test Schedule:
1. The required hydrostatic test pressures shall be as specified by the Design ENGINEER and approved by SD1.
  2. Unless otherwise specified, the required hydrostatic test pressures are at the lowest elevation of the pipeline.
- C. Pressure Test Procedure for Force Mains:
1. Complete backfill and compaction of entire pipe before testing, unless otherwise required or approved by ENGINEER
  2. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
  3. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
  4. A successful test shall be defined as zero drop in the specified test pressure during the two hour testing period.
- D. Displacement of Pipe
1. The sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade have occurred as each portion of the sewer is completed between manhole locations. When the test is required by SD1, it shall be as follows:
    - a. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between manhole locations or by utilizing a laser beam.
    - b. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
    - c. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect to the satisfaction of SD1.
    - d. This test may be done after the pipe sections have been laid, the joints completed and the bedding completed to twelve (12) inches above the pipe sections, or after completion of the sewer and all backfilling has been undertaken or both.

E. Deflection of Pipe

1. A deflection test shall be performed on all gravity sanitary sewers using flexible pipe. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid mandrel, or equal means approved by SD1, and shall have a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturer's tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.
2. A deflection test shall be performed on all ductile iron gravity sanitary sewers exceeding twelve (12) feet in depth. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid fin style mandrel fitted with rubber inline skate wheels, rubber padding on the fins, or equal means to prevent damage to the internal lining of the pipe. If a wheeled mandrel is used each fin shall have 2 wheels made of polyurethane with a Shore Scale durometer value of between 78A and 82A. Any damages to the lining from the mandrel testing shall be repaired to the satisfaction of SD1 at the sole expense of the CONTRACTOR. Final diameter of the protected mandrel shall be equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturers' tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.

F. Air Test for Gravity Sewers 42" and Smaller

1. The CONTRACTOR shall test the tightness of the pipe sections, joints and appurtenances of all gravity sewers by means of the low pressure air test.
2. No tests shall be made until the backfill is consolidated over the pipe and all service lines in the section to be tested have been connected and plugged.
3. The low pressure air test shall be conducted in accordance with procedures outlined in UNIBELL Specification UNI B-6. If the section of sewer being tested is below the elevation of ground water in the trench, the test pressure shall be 0.433 psi for each foot of ground water above the invert of the pipe.
4. All tests must be witnessed and approved by a representative of SD1.
5. Any leaks determined from the air test shall be replaced by the CONTRACTOR to the satisfaction of SD1.
6. The minimum air test pressure for all gravity sewers shall be 7 psi.

G. Individual Pipe Joint Testing for Gravity Sewers 48" and Greater.

1. The CONTRACTOR shall test each individual joint of the gravity sewers using the following procedure:
  - a. The test pressure shall be 22 psig for 10 minutes using the individual joint apparatus, based in the ASTM 4161 joint test

- standards. The pressure gage used shall read in one (1) psi increments.
- b. Center the joint tester over the joint. Inflate the outer element to the manufacturer's specified pressure over the desired test pressure.
  - c. Fill the center of the joint tester cavity with water or air, dependent upon test used, until it flows evenly from the bleed off valve, which removes air from the outer cavity. The bleed off valve shall be located at the top of the joint tester assembly. Close the bleed -off valve and pressurize the cavity to the test pressure. Allow pressure to stabilize (10 to 15 seconds).
  - d. The test time period is 10 minutes. If the pressure in the cavity drops below 22 psig, the joint is defective and fails the test.
  - e. When the joint test is completed, all pressure must be exhausted from the center cavity and from the end element to 0 psig. The joint tester can then be transported and positioned on the next joint to be tested.

H. Repair of Failed Pipe Sections:

1. Contact SD1 24 hours prior to making any repairs to failed pipe sections. SD1 shall be present during the entire duration of time repairs are being made to failed sections of pipe.
2. The CONTRACTOR shall remove and replace, at no extra cost to SD1 all sections of pipe which fail any of the tests specified in this section in accordance with the following procedures:
  - a. Excavate failed sections of pipe in accordance with Section 02220.
  - b. Cut out and/or remove failed sections and relay new pipe beginning at nearest joint.
  - c. Close pipe with pipe coupling per manufacturer's recommendation and approval of SD1.
3. The CONTRACTOR shall provide all material, labor, and equipment necessary to remove and replace the failed pipe section.
4. Retest the replaced sewer sections to meet the requirements listed in this section.

3.8 CLEANING AND DISINFECTION

A. Cleaning:

1. Thoroughly clean all piping and flush in a manner approved by ENGINEER, prior to placing in service.
2. Piping 24 inches in diameter and larger shall be inspected from inside and all debris, dirt and foreign matter removed.

3. If piping which requires disinfection has not been kept clean during storage or installation, CONTRACTOR shall swab each section individually before installation with a five percent hypochlorite solution, to ensure clean piping.
- B. Disinfection:
1. Disinfect all potable and finished water piping.
  2. A suggested procedure for accomplishing complete and satisfactory disinfection is specified below. Other procedures will be considered for approval by the ENGINEER.
    - a. Thoroughly flush piping prior to disinfection with water. For pipelines 24 inches in diameter and larger, pipelines shall be manually cleaned, carefully removing all sweepings, dirt and debris prior to disinfection.
    - b. Conform to procedures described in AWWA C651. Continuous feed method of disinfecting shall be used unless alternative method is acceptable to ENGINEER.
  3. CONTRACTOR shall supply water for initial flushing, testing and chlorination. CONTRACTOR shall provide all temporary piping, hose, valves, appurtenances and services required. Cost of water required for re-disinfection will be paid by CONTRACTOR.
  4. Chlorine will be supplied by CONTRACTOR.
  5. Bacteriologic tests will be performed by SD1. A certified test laboratory report will be made available to CONTRACTOR, if requested.
  6. After the required retention period, the heavily chlorinated water shall be flushed to wet well at a rate acceptable to SD1.

### 3.9 CLEAN-UP

Upon completion of the installation of the piping and appurtenances, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line. Refer to Section 02900, Landscaping, for restoration.

- END OF SECTION -

# Standard Electric and Communications Bid Item Descriptions

**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 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 2134IND.*

**EC DUCT** These items shall include all labor, equipment, and material to excavate, install, and backfill the specified bank of duct at locations shown in the plans in accordance with the specifications and standard drawings complete and ready for use. These bid items shall include all necessary appurtenances, connections, fittings, plugs, tees, bends, collars, racks or spacers, pull string, granular or concrete encasement, compacted earth or flowable fill backfill, and etc. Flowable fill, where specified on the plans and specifications, shall be considered incidental to the duct items. No separate payment will be made for flowable fill, unless directed to be used contrary to plans and specifications. All excavation shall be unclassified. No additional payment will be made for rock excavation. Duct shall be measured as the horizontal distance from outside face of structure to outside face of structure; or, to the point of duct termination at dead ends or poles. No additional payment will be made for vertical conduit. No separate bid items will be provided due to varying duct sizes. Any and all duct sizes and configurations shall be paid under these items. The only variations in bid items shall be in the number of duct in a bank and if the duct is or is not to be concrete encased. 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).

**EC ELECTRIC MANHOLE, ELECTRIC PIT, ELECTRIC PULL BOX, COMMUNICATIONS MANHOLE, COMMUNICATIONS PULL BOX** These items shall include all labor, equipment, excavation, materials, and backfill to install the specified manhole, pit, or pull box at the locations as shown on the plans in accordance with the specifications and standard drawings complete and ready for use. No separate bid items will be provided for varying sizes of structures. All structures shall be paid under the appropriate bid item regardless of size. Where structures are specified to be backfilled with flowable fill, the cost of the flowable fill shall be considered incidental to the 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.

**EC LINE MARKER** This item is for payment for furnishing and installing a ground level electric or communications 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.

# Standard Electric And Communications Bid Descriptions

EC DUCT These items shall include all labor, equipment, and material to excavate, install, and backfill the specified bank of duct at locations shown in the plans in accordance with the specifications and standard drawings complete and ready for use. These bid items shall include all necessary appurtenances, connections, fittings, plugs, tees, bends, collars, racks or spacers, pull string, granular or concrete encasement, compacted earth or flowable fill backfill, etc. Flowable fill, where specified on the plans and specifications, shall be considered incidental to the duct items. No separate payment will be made for flowable fill, unless directed to be used contrary to plans and specifications. All excavation shall be unclassified. No additional payment will be made for rock excavation. Duct shall be measured as the horizontal distance from outside face of structure to outside face of structure; or, to the point of duct termination at dead ends or poles. No additional payment will be made for vertical conduit. No separate bid items will be provided due to varying duct sizes. Any and all duct sizes and configurations shall be paid under these items. The only variations in bid items shall be in the number of duct in a bank and if the duct is or is not to be concrete encased. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid LINEAR FEET (LF).

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KyTC BMP Plan for Project PCN ## - ####



**Kentucky Transportation Cabinet**

**Highway District 6**

**And**

\_\_\_\_\_ **(2), Construction**

**Kentucky Pollutant Discharge Elimination System**

**Permit KYR10**

**Best Management Practices (BMP) plan**

**Groundwater protection plan**

**For Highway Construction Activities**

**For**

**KY 9 in Newport, Reconstruction**

**Project: PCN ## - ####**

**Item 06-8101.20**

## KyTC BMP Plan for Project PCN ## - ####

### Project information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District 6
2. Resident Engineer: (2)
3. Contractor name: (2)  
Address: (2)  
  
Phone number: (2)  
Contact: (2)  
Contractors agent responsible for compliance with the KPDES permit requirements (3):
4. Project Control Number (2)
5. Route (Address) KY 9
6. Latitude/Longitude (project mid-point) dd/mm/ss, dd/mm/ss 39^05'29"  
north, 84^29'55" west
7. County (project mid-point) Campbell County
8. Project start date (date work will begin): (2)
9. Projected completion date: (2)

## KyTC BMP Plan for Project PCN ## - ####

### A. Site description:

1. Nature of Construction Activity (from letting project description) **Roadway reconstruction**
2. Order of major soil disturbing activities **(2) and (3)**
3. Projected volume of material to be moved **13,703 CY**
4. Estimate of total project area (acres) **12.8 Acres**
5. Estimate of area to be disturbed (acres) **12.8 Acres**
6. Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information. **0.4**
7. Data describing existing soil condition **(2)**
8. Data describing existing discharge water quality (if any) **(2)**
9. Receiving water name, Ohio and Licking Rivers
10. TMDLs and Pollutants of Concern in Receiving Waters: **(1 DEA)**
11. Site map – Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.
12. Potential sources of pollutants:  
  
The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. **(3)**

## KyTC BMP Plan for Project PCN ## - #####

### **B. Sediment and Erosion Control Measures:**

1. Plans for highway construction projects will include erosion control sheets that depict Disturbed Drainage Areas (DDAs) and related information. These plan sheets will show the existing project conditions with areas delineated by DDA within the right of way limits, the discharge points and the areas that drain to each discharge point. Project managers and designers will analyze the DDAs and identify Best Management Practices (BMPs) that are site specific. The balance of the BMPs for the project will be listed in the bid documents for selection and use by the contractor on the project with approval by the resident engineer.

Projects that do not have DDAs annotated on the erosion control sheets will employ the same concepts for development and managing BMP plans.

2. Following award of the contract, the contractor and resident engineer will annotate the erosion control sheets showing location and type of BMPs for each of the DDAs that will be disturbed at the outset of the project. This annotation will be accompanied by an order of work that reflects the order or sequence of major soil moving activities. The remaining DDAs are to be designated as "Do Not Disturb" until the contractor and resident engineer prepare the plan for BMPs to be employed. The initial BMP's shall be for the first phase (generally Clearing and Grubbing) and shall be modified as needed as the project changes phases. The BMP Plan will be modified to reflect disturbance in additional DDA's as the work progresses. All DDA's will have adequate BMP's in place before being disturbed.
3. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:
  - Construction Access – This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with gravel and temporary mulch and/or vegetation.
  - At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.

## KyTC BMP Plan for Project PCN ## - ####

- Clearing and Grubbing – The following BMP's will be considered and used where appropriate.
  - Leaving areas undisturbed when possible.
  - Silt basins to provide silt volume for large areas.
  - Silt Traps Type A for small areas.
  - Silt Traps Type C in front of existing and drop inlets which are to be saved
  - Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
  - Brush and/or other barriers to slow and/or divert runoff.
  - Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple rows of silt fence may be considered.
  - Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
  - Non-standard or innovative methods.
- Cut & Fill and placement of drainage structures - The BMP Plan will be modified to show additional BMP's such as:
  - Silt Traps Type B in ditches and/or drainways as they are completed
  - Silt Traps Type C in front of pipes after they are placed
  - Channel Lining
  - Erosion Control Blanket
  - Temporary mulch and/or seeding for areas where construction activities will be ceased for 21 days or more.
  - Non-standard or innovative methods
- Profile and X-Section in place – The BMP Plan will be modified to show elimination of BMP's which had to be removed and the addition of new BMP's as the roadway was shaped. Probably changes include:
  - Silt Trap Type A, Brush and/or other barriers, Temporary Mulch, and any other BMP which had to be removed for final grading to take place.
  - Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
  - Additional Channel Lining and/or Erosion Control Blanket.
  - Temporary Mulch for areas where Permanent Seeding and Protection cannot be done within 21 days.
  - Special BMP's such as Karst Policy
- Finish Work (Paving, Seeding, Protect, etc.) – A final BMP Plan will result from modifications during this phase of construction. Probably changes include:
  - Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMP's which are sufficient to control erosion, i.e. Erosion Control Blanket or Permanent Seeding and Protection on moderate grades.

## KyTC BMP Plan for Project PCN ## - #####

- Permanent Seeding and Protection
  - Placing Sod
  - Planting trees and/or shrubs where they are included in the project
- BMP's including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMP's to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are : N/A

### **C. Other Control Measures**

1. No solid materials, including building materials, shall be discharged to waters of the commonwealth, except as authorized by a Section 404 permit.
2. Waste Materials

All waste materials that may leach pollutants (paint and paint containers, caulk tubes, oil/grease containers, liquids of any kind, soluble materials, etc.) will be collected and stored in appropriate covered waste containers. Waste containers shall be removed from the project site on a sufficiently frequent basis as to not allow wastes to become a source of pollution. All personnel will be instructed regarding the correct procedure for waste disposal. Wastes will be disposed in accordance with appropriate regulations. Notices stating these practices will be posted in the office.

3. Hazardous Waste

All hazardous waste materials will be managed and disposed of in the manner specified by local or state regulation. The contractor shall notify the Resident Engineer if there any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the contractor regarding waste management requirements.

4. Spill Prevention

The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff.

- **Good Housekeeping:**

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The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough product required to do the job
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
- Products will be kept in their original containers with the original manufacturer's label
- Substances will not be mixed with one another unless recommended by the manufacturer
- Whenever possible, all of the product will be used up before disposing of the container
- Manufacturers' recommendations for proper use and disposal will be followed
- The site contractor will inspect daily to ensure proper use and disposal of materials onsite

### ➤ **Hazardous Products:**

These practices will be used to reduce the risks associated with any and all hazardous materials.

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data sheets (MSDS) will be reviewed and retained
- Contractor will follow procedures recommended by the manufacturer when handling hazardous materials
- If surplus product must be disposed of, manufacturers' or state/local recommended methods for proper disposal will be followed

### **The following product-specific practices will be followed onsite:**

#### ➤ **Petroleum Products:**

Vehicles and equipment that are fueled and maintained on site will be monitored for leaks, and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products onsite will be stored in tightly sealed containers, which are clearly labeled and will be protected from exposure to weather.

The contractor shall prepare an Oil Pollution Spill Prevention Control and Countermeasure plan when the project that involves the storage of petroleum products in 55 gallon or larger containers with a total combined storage capacity of 1,320 gallons. This is a requirement of 40 CFR 112.

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This project (will / will not) (3) have over 1,320 gallons of petroleum products with a total capacity, sum of all containers 55 gallon capacity and larger.

### ➤ **Fertilizers:**

Fertilizers will be applied at rates prescribed by the contract, standard specifications or as directed by the resident engineer. Once applied, fertilizer will be covered with mulch or blankets or worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

### ➤ **Paints:**

All containers will be tightly sealed and stored indoors or under roof when not being used. Excess paint or paint wash water will not be discharged to the drainage or storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

### ➤ **Concrete Truck Washout:**

Concrete truck mixers and chutes will not be washed on pavement, near storm drain inlets, or within 75 feet of any ditch, stream, wetland, lake, or sinkhole. Where possible, excess concrete and wash water will be discharged to areas prepared for pouring new concrete, flat areas to be paved that are away from ditches or drainage system features, or other locations that will not drain off site. Where this approach is not possible, a shallow earthen wash basin will be excavated away from ditches to receive the wash water

### ➤ **Spill Control Practices**

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted. All personnel will be made aware of procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

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- Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
- The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
- Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

### **D. Other State and Local Plans**

This BMP plan shall include any requirements specified in sediment and erosion control plans, storm water management plans or permits that have been approved by other state or local officials. Upon submittal of the NOI, other requirements for surface water protection are incorporated by reference into and are enforceable under this permit (even if they are not specifically included in this BMP plan). This provision does not apply to master or comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit issued for the construction site by state or local officials.

### **E. Maintenance**

1. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.
- Maintenance of BMPs during construction shall be a result of weekly and post rain event inspections with action being taken by the contractor to correct deficiencies.
  - Post Construction maintenance will be a function of normal highway maintenance operations. Following final project acceptance by the cabinet, district highway crews will be responsible for identification and correction of deficiencies regarding ground cover and cleaning of storm water BMPs. The project manager shall identify any BMPs that will be for the purpose of post construction storm water management with specific guidance for any non-routine maintenance.

### **F. Inspections**

Inspection and maintenance practices that will be used to maintain erosion and sediment controls:

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- All erosion prevention and sediment control measures will be inspected at least once each week and following any rain of one-half inch or more.
- Inspections will be conducted by individuals that have received KyTC Grade Level II training or other qualification as prescribed by the cabinet that includes instruction concerning sediment and erosion control.
- Inspection reports will be written, signed, dated, and kept on file.
- Areas at final grade will be seeded and mulched within 14 days.
- Areas that are not at final grade where construction has ceased for a period of 21 days or longer and soil stock piles shall receive temporary mulch no later than 14 days from the last construction activity in that area.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of being reported.
- Built-up sediment will be removed from behind the silt fence before it has reached halfway up the height of the fence.
- Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
- Sediment basins will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 70 percent of the design capacity and at the end of the job.
- Diversion dikes and berms will be inspected and any breaches promptly repaired. Areas that are eroding or scouring will be repaired and re-seeded / mulched as needed.
- Temporary and permanent seeding and mulching will be inspected for bare spots, washouts, and healthy growth. Bare or eroded areas will be repaired as needed.
- All material storage and equipment servicing areas that involve the management of bulk liquids, fuels, and bulk solids will be inspected weekly for conditions that represent a release or possible release of pollutants to the environment.

## **G. Non – Storm Water discharges**

It is expected that non-storm water discharges may occur from the site during the construction period. Examples of non-storm water discharges include:

- Water from water line flushings.
- Water from cleaning concrete trucks and equipment.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).

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- Uncontaminated groundwater and rain water (from dewatering during excavation).

All non-storm water discharges will be directed to the sediment basin or to a filter fence enclosure in a flat vegetated infiltration area or be filtered via another approved commercial product.

### H. Groundwater Protection Plan (3)

This plan serves as the groundwater protection plan as required by 401 KAR 5:037.

- Contractors statement: (3)

The following activities, as enumerated by 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan, will or may be conducted as part of this construction project:

\_\_\_\_\_ 2. (e) land treatment or land disposal of a pollutant;

\_\_\_\_\_ 2. (f) Storing, ..., or related handling of hazardous waste, solid waste or special waste, ..., in tanks, drums, or other containers, or in piles, (This does not include wastes managed in a container placed for collection and removal of municipal solid waste for disposal off site);

\_\_\_\_\_ 2. (g) .... Handling of materials in bulk quantities (equal or greater than 55 gallons or 100 pounds net dry weight transported held in an individual container) that, if released to the environment, would be a pollutant;

\_\_\_\_\_ 2. (j) Storing or related handling of road oils, dust suppressants, ....., at a central location;

\_\_\_\_\_ 2. (k) Application or related handling of road oils, dust suppressants or deicing materials, (does not include use of chloride-based deicing materials applied to roads or parking lots);

\_\_\_\_\_ 2. (m) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

Or, check the following only if there are no qualifying activities

\_\_\_\_\_ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

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The contractor is responsible for the preparation of a plan that addresses the

401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

- (a) General information about this project is covered in the Project information;
- (b) Activities that require a groundwater protection plan have been identified above;
- (c) Practices that will protect groundwater from pollution are addressed in section C. Other control measures.
- (d) Implementation schedule – all practices required to prevent pollution of groundwater are to be in place prior to conducting the activity;
- (e) Training is required as a part of the ground water protection plan. All employees of the contractor, sub-contractor and resident engineer personnel will be trained to understand the nature and requirements of this plan as they pertain to their job function(s). Training will be accomplished within one week of employment and annually thereafter. A record of training will be maintained by the contractor with a copy provide to the resident engineer.
- (f) Areas of the project and groundwater plan activities will be inspected as part of the weekly sediment and erosion control inspections
- (g) Certification (see signature page.)





# Department For Environmental Protection

for Environmental Protection eForms Application.

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ing electronic form (eForm): KPDES FORM eNOI-SW (Construction): (KPDES Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity Under the KPDES General Permit). You may continue with Blank eForm" button below or retrieve a previously saved version by entering your eForm Transaction ID in the field provided below.

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**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 2012* and *Standard Drawings, Edition of 2012 with the 2012 Revision*.

**Supplemental Specifications to the  
 Standard Specifications for Road and Bridge Construction, 2012 Edition  
 Effective with the July 31, 2015 Letting**

<b>Subsection:</b>	102.15 Process Agent.
<b>Revision:</b>	Replace the 1st paragraph with the following: Every corporation doing business with the Department shall submit evidence of compliance with KRS Sections 14A.4-010, 271B.11-010, 271B.11-070, 271B.11-080, 271B.5-010 and 271B.16-220, and file with the Department the name and address of the process agent upon whom process may be served.
<b>Subsection:</b>	105.13 Claims Resolution Process.
<b>Revision:</b>	Delete all references to TC 63-34 and TC 63-44 from the subsection as these forms are no longer available through the forms library and are forms generated within the AASHTO SiteManager software.
<b>Subsection:</b>	108.03 Preconstruction Conference.
<b>Revision:</b>	Replace 8) Staking with the following: 8) Staking (designated by a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.
<b>Subsection:</b>	109.07.02 Fuel.
<b>Revision:</b>	Revise item Crushed Aggregate Used for Embankment Stabilization to the following: Crushed Aggregate Used for Stabilization of Unsuitable Materials Used for Embankment Stabilization
	Delete the following item from the table. <del>Crushed Sandstone Base (Cement Treated)</del>
<b>Subsection:</b>	110.02 Demobilization.
<b>Revision:</b>	Replace the first part of the first sentence of the second paragraph with the following: Perform all work and operations necessary to accomplish final clean-up as specified in the first paragraph of Subsection 105.12;
<b>Subsection:</b>	112.03.12 Project Traffic Coordinator (PTC).
<b>Revision:</b>	Replace the last paragraph of this subsection with the following: Ensure the designated PTC has sufficient skill and experience to properly perform the task assigned and has successfully completed the qualification courses.
<b>Subsection:</b>	112.04.18 Diversions (By-Pass Detours).
<b>Revision:</b>	Insert the following sentence after the 2nd sentence of this subsection. The Department will not measure temporary drainage structures for payment when the contract documents provide the required drainage opening that must be maintained with the diversion. The temporary drainage structures shall be incidental to the construction of the diversion. If the contract documents fail to provide the required drainage opening needed for the diversion, the cost of the temporary drainage structure will be handled as extra work in accordance with section 109.04.
<b>Subsection:</b>	201.03.01 Contractor Staking.
<b>Revision:</b>	Replace the first paragraph with the following: Perform all necessary surveying under the general supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.

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 Standard Specifications for Road and Bridge Construction, 2012 Edition  
 Effective with the July 31, 2015 Letting**

<b>Subsection:</b>	201.04.01 Contractor Staking.
<b>Revision:</b>	Replace the last sentence of the paragraph with the following: Complete the general layout of the project under the supervision of a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.
<b>Subsection:</b>	206.04.01 Embankment-in-Place.
<b>Revision:</b>	Replace the fourth paragraph with the following: The Department will not measure <b>suitable</b> excavation included in the original plans that is disposed of for payment and will consider it incidental to Embankment-in-Place.
<b>Subsection:</b>	208.02.01 Cement.
<b>Revision:</b>	Replace paragraph with the following: Select Type I or Type II cement conforming to Section 801. Use the same type cement throughout the work.
<b>Subsection:</b>	208.03.06 Curing and Protection.
<b>Revision:</b>	Replace the fourth paragraph with the following: Do not allow traffic or equipment on the finished surface until the stabilized subgrade has cured for a total of 7-days with an ambient air temperature above 40 degrees Fahrenheit. A curing day consists of a continuous 24-hour period in which the ambient air temperature does not fall below 40 degrees Fahrenheit. Curing days will not be calculated consecutively, but must total seven (7) , 24-hour days with the ambient air temperature remaining at or above 40 degrees Fahrenheit before traffic or equipment will be allowed to traverse the stabilized subgrade. The Department may allow a shortened curing period when the Contractor requests. The Contractor shall give the Department at least 3 day notice of the request for a shortened curing period. The Department will require a minimum of 3 curing days after final compaction. The Contractor shall furnish cores to the treated depth of the roadbed at 500 feet intervals for each lane when a shortened curing time is requested. The Department will test cores using an unconfined compression test. Roadbed cores must achieve a minimum strength requirement of 80 psi.
<b>Subsection:</b>	208.03.06 Curing and Protection.
<b>Revision:</b>	Replace paragraph eight with the following: At no expense to the Department, repair any damage to the subgrade caused by freezing.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	A) Seed Mixtures for Permanent Seeding.
<b>Revision:</b>	Revise <b>Seed Mix Type I</b> to the mixture shown below: 50% Kentucky 31 Tall Fescue (Festuca arundinacea) 35% Hard Fescue (Festuca (Festuca longifolia) 10% Ryegrass, Perennial (Lolium perenne) 5% White Dutch Clover (Trifolium repens)
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	A) Seed Mixtures for Permanent Seeding.
<b>Number:</b>	2)
<b>Revision:</b>	Replace the paragraph with the following: Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 4, 5, 6, and 7. Apply seed mix Type II at a minimum application rate of 100 pounds per acre. If adjacent to a golf course replace the crown vetch with Kentucky 31 Tall Fescue.

**Supplemental Specifications to the  
 Standard Specifications for Road and Bridge Construction, 2012 Edition  
 Effective with the July 31, 2015 Letting**

<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	A) Seed Mixtures for Permanent Seeding.
<b>Number:</b>	3)
<b>Revision:</b>	Replace the paragraph with the following: Permanent Seeding on Slopes Greater than 3:1 in Highway Districts 1, 2, 3, 8, 9, 10, 11, and 12. Apply seed mix Type III at a minimum application rate of 100 pounds per acre. If adjacent to crop land or golf course, replace the Sericea Lespedeza with Kentucky 31 Fescue.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	B) Procedures for Permanent Seeding.
<b>Revision:</b>	Delete the first sentence of the section.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	B) Procedures for Permanent Seeding.
<b>Revision:</b>	Replace the second and third sentence of the section with the following: Prepare a seedbed and apply an initial fertilizer that contains a minimum of 100 pounds of nitrogen, 100 pounds of phosphate, and 100 pounds of potash per acre. Apply agricultural limestone to the seedbed when the Engineer determines it is needed. When required, place agricultural limestone at a rate of 3 tons per acre.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	D) Top Dressing.
<b>Revision:</b>	Change the title of part to D) Fertilizer.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	D) Fertilizer.
<b>Revision:</b>	Replace the first paragraph with the following: Apply fertilizer at the beginning of the seeding operation and after vegetation is established. Use fertilizer delivered to the project in bags or bulk. Apply initial fertilizer to all areas prior to the seeding or sodding operation at the application rate specified in 212.03.03 B). Apply 20-10-10 fertilizer to the areas after vegetation has been established at a rate of 11.5 pounds per 1,000 square feet. Obtain approval from the Engineer prior to the 2nd fertilizer application. Reapply fertilizer to any area that has a streaked appearance. The reapplication shall be at no additional cost to the Department. Re-establish any vegetation severely damaged or destroyed because of an excessive application of fertilizer at no cost to the Department.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
<b>Part:</b>	D) Fertilizer.
<b>Revision:</b>	Delete the second paragraph.
<b>Subsection:</b>	212.04.04 Agricultural Limestone.
<b>Revision:</b>	Replace the entire section with the following: The Department will measure the quantity of agricultural limestone in tons.
<b>Subsection:</b>	212.04.05 Fertilizer.
<b>Revision:</b>	Replace the entire section with the following: The Department will measure fertilizer used in the seeding or sodding operations for payment. The Department will measure the quantity by tons.

**Supplemental Specifications to the  
 Standard Specifications for Road and Bridge Construction, 2012 Edition  
 Effective with the July 31, 2015 Letting**

<b>Subsection:</b>	212.05 PAYMENT.												
<b>Revision:</b>	Delete the following item code:												
	<table border="1"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Item</u></th> <th><u>Pay Unit</u></th> </tr> </thead> <tbody> <tr> <td>05966</td> <td>Topdressing Fertilizer</td> <td>Ton</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	05966	Topdressing Fertilizer	Ton						
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>											
05966	Topdressing Fertilizer	Ton											
<b>Subsection:</b>	212.05 PAYMENT.												
<b>Revision:</b>	Add the following pay items:												
	<table border="1"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Item</u></th> <th><u>Pay Unit</u></th> </tr> </thead> <tbody> <tr> <td>05963</td> <td>Initial Fertilizer</td> <td>Ton</td> </tr> <tr> <td>05964</td> <td>20-10-10 Fertilizer</td> <td>Ton</td> </tr> <tr> <td>05992</td> <td>Agricultural Limestone</td> <td>Ton</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	05963	Initial Fertilizer	Ton	05964	20-10-10 Fertilizer	Ton	05992	Agricultural Limestone	Ton
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>											
05963	Initial Fertilizer	Ton											
05964	20-10-10 Fertilizer	Ton											
05992	Agricultural Limestone	Ton											
<b>Subsection:</b>	213.03.02 Progress Requirements.												
<b>Revision:</b>	Replace the last sentence of the third paragraph with the following: Additionally, the Department will apply a penalty equal to the liquidated damages when all aspects of work are not coordinated in an acceptable manner within 7 calendar days after written notification.												
<b>Subsection:</b>	213.03.05 Temporary Control Measures.												
<b>Part:</b>	E) Temporary Seeding and Protection.												
<b>Revision:</b>	Delete the second sentence of the first paragraph.												
<b>Subsection:</b>	304.02.01 Physical Properties.												
<b>Table:</b>	Required Geogrid Properties												
<b>Revision:</b>	Replace all references to Test Method "GRI-GG2-87" with ASTM D 7737.												
<b>Subsection:</b>	402.03.02 Contractor Quality Control and Department Acceptance.												
<b>Part:</b>	B) Sampling.												
<b>Revision:</b>	Replace the second sentence with the following: The Department will determine when to obtain the quality control samples using the random-number feature of the mix design submittal and approval spreadsheet. The Department will randomly determine when to obtain the verification samples required in Subsections 402.03.03 and 402.03.04 using the Asphalt Mixture Sample Random Tonnage Generator.												
<b>Subsection:</b>	402.03.02 Contractor Quality Control and Department Acceptance.												
<b>Part:</b>	D) Testing Responsibilities.												
<b>Number:</b>	3) VMA.												
<b>Revision:</b>	Add the following paragraph below Number 3) VMA: Retain the AV/VMA specimens and one additional corresponding $G_{mm}$ sample for 5 working days for mixture verification testing by the Department. For Specialty Mixtures, retain a mixture sample for 5 working days for mixture verification testing by the Department. When the Department's test results do not verify that the Contractor's quality control test results are within the acceptable tolerances according to Subsection 402.03.03, retain the samples and specimens from the affected subplot(s) for the duration of the project.												
<b>Subsection:</b>	402.03.02 Contractor Quality Control and Department Acceptance.												
<b>Part:</b>	D) Testing Responsibilities.												
<b>Number:</b>	4) Density.												
<b>Revision:</b>	Replace the second sentence of the Option A paragraph with the following: Perform coring by the end of the following work day.												

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<b>Subsection:</b>	402.03.02 Contractor Quality Control and Department Acceptance.
<b>Part:</b>	D) Testing Responsibilities.
<b>Number:</b>	5) Gradation.
<b>Revision:</b>	Delete the second paragraph.
<b>Subsection:</b>	402.03.02 Contractor Quality Control and Department Acceptance.
<b>Part:</b>	H) Unsatisfactory Work.
<b>Number:</b>	1) Based on Lab Data.
<b>Revision:</b>	Replace the second paragraph with the following: When the Engineer determines that safety concerns or other considerations prohibit an immediate shutdown, continue work and the Department will make an evaluation of acceptability according to Subsection 402.03.05.
<b>Subsection:</b>	402.03.03 Verification.
<b>Revision:</b>	Replace the first paragraph with the following: <b>402.03.03 Mixture Verification.</b> For volumetric properties, the Department will perform a minimum of one verification test for AC, AV, and VMA according to the corresponding procedures as given in Subsection 402.03.02. The Department will randomly determine when to obtain the verification sample using the Asphalt Mixture Sample Random Tonnage Generator. For specialty mixtures, the Department will perform one AC and one gradation determination per lot according to the corresponding procedures as given in Subsection 402.03.02. However, Department personnel will not perform AC determinations according to KM 64-405. The Contractor will obtain a quality control sample at the same time the Department obtains the mixture verification sample and perform testing according to the procedures given in Subsection 402.03.02. If the Contractor's quality control sample is verified by the Department's test results within the tolerances provided below, the Contractor's sample will serve as the quality control sample for the affected subplot. The Department may perform the mixture verification test on the Contractor's equipment or on the Department's equipment.
<b>Subsection:</b>	402.03.03 Verification.
<b>Part:</b>	A) Evaluation of Subplot(s) Verified by Department.
<b>Revision:</b>	Replace the third sentence of the second paragraph with the following: When the paired <i>t</i> -test indicates that the Contractor's data and Department's data are possibly not from the same population, the Department will investigate the cause for the difference according to Subsection 402.03.05 and implement corrective measures as the Engineer deems appropriate.
<b>Subsection:</b>	402.03.03 Verification.
<b>Part:</b>	B) Evaluation of Subplots Not Verified by Department.
<b>Revision:</b>	Replace the third sentence of the first paragraph with the following: When differences between test results are not within the tolerances listed below, the Department will resolve the discrepancy according to Subsection 402.03.05.

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<b>Subsection:</b>	402.03.03 Verification.
<b>Part:</b>	B) Evaluation of Sublots Not Verified by Department.
<b>Revision:</b>	Replace the third sentence of the second paragraph with the following: When the <i>F</i> -test or <i>t</i> -test indicates that the Contractor's data and Department's data are possibly not from the same population, the Department will investigate the cause for the difference according to Subsection 402.03.05 and implement corrective measures as the Engineer deems appropriate.
<b>Subsection:</b>	402.03.03 Verification.
<b>Part:</b>	C) Test Data Patterns.
<b>Revision:</b>	Replace the second sentence with the following: When patterns indicate substantial differences between the verified and non-verified sublots, the Department will perform further comparative testing according to subsection 402.03.05.
<b>Subsection:</b>	402.03 CONSTRUCTION.
<b>Revision:</b>	Add the following subsection: <b>402.03.04 Testing Equipment and Technician Verification.</b> For mixtures with a minimum quantity of 20,000 tons and for every 20,000 tons thereafter, the Department will obtain an additional verification sample at random using the Asphalt Mixture Sample Random Tonnage Generator in order to verify the integrity of the Contractor's and Department's laboratory testing equipment and technicians. The Department will obtain a mixture sample of at least 150 lb at the asphalt mixing plant according to KM 64-425 and split it according to AASHTO R 47. The Department will retain one split portion of the sample and provide the other portion to the Contractor. At a later time convenient to both parties, the Department and Contractor will simultaneously reheat the sample to the specified compaction temperature and test the mixture for AV and VMA using separate laboratory equipment according to the corresponding procedures given in Subsection 402.03.02. The Department will evaluate the differences in test results between the two laboratories. When the difference between the results for AV or VMA is not within $\pm 2.0$ percent, the Department will investigate and resolve the discrepancy according to Subsection 402.03.05.
<b>Subsection:</b>	402.03.04 Dispute Resolution.
<b>Revision:</b>	Change the subsection number to 402.03.05.
<b>Subsection:</b>	402.05 PAYMENT.
<b>Part:</b>	Lot Pay Adjustment Schedule Compaction Option A Base and Binder Mixtures
<b>Table:</b>	AC
<b>Revision:</b>	Replace the Deviation from JMF(%) that corresponds to a Pay Value of 0.95 to $\pm 0.6$ .
<b>Subsection:</b>	403.02.10 Material Transfer Vehicle (MTV).
<b>Revision:</b>	Replace the first sentence with the following: In addition to the equipment specified above, provide a MTV with the following minimum characteristics:
<b>Subsection:</b>	412.02.09 Material Transfer Vehicle (MTV).
<b>Revision:</b>	Replace the paragraph with the following: Provide and utilize a MTV with the minimum characteristics outlined in section 403.02.10.

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<b>Subsection:</b>	412.03.07 Placement and Compaction.
<b>Revision:</b>	Replace the first paragraph with the following: Use a MTV when placing SMA mixture in the driving lanes. The MTV is not required on ramps and/or shoulders unless specified in the contract. When the Engineer determines the use of the MTV is not practical for a portion of the project, the Engineer may waive its requirement for that portion of pavement by a letter documenting the waiver.
<b>Subsection:</b>	412.04 MEASUREMENT.
<b>Revision:</b>	Add the following subsection: 412.04.03. Material Transfer Vehicle (MTV). The Department will not measure the MTV for payment and will consider its use incidental to the asphalt mixture.
<b>Subsection:</b>	501.03.05 Weather Limitations and Protection.
<b>Revision:</b>	Replace the reference to Subsection 501.03.19 in Paragraph 5, with Subsection 501.03.20.
<b>Subsection:</b>	501.03.19 Surface Tolerances and Testing Surface.
<b>Part:</b>	B) Ride Quality.
<b>Revision:</b>	Add the following to the end of the first paragraph: The Department will specify if the ride quality requirements are Category A or Category B when ride quality is specified in the Contract. Category B ride quality requirements shall apply when the Department fails to classify which ride quality requirement will apply to the Contract.
<b>Subsection:</b>	603.03.06 Cofferdams.
<b>Revision:</b>	Replace the seventh sentence of paragraph one with the following: Submit drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky.
<b>Subsection:</b>	605.03.04 Tack Welding.
<b>Revision:</b>	Insert the subsection and the following: 605.03.04 Tack Welding. The Department does not allow tack welding.
<b>Subsection:</b>	606.03.17 Special Requirements for Latex Concrete Overlays.
<b>Part:</b>	A) Existing Bridges and New Structures.
<b>Number:</b>	1) Prewetting and Grout-Bond Coat.
<b>Revision:</b>	Add the following sentence to the last paragraph: Do not apply a grout-bond coat on bridge decks prepared by hydrodemolition.
<b>Subsection:</b>	609.03 Construction.
<b>Revision:</b>	Replace Subsection 609.03.01 with the following: 609.03.01 A) Swinging the Spans. Before placing concrete slabs on steel spans or precast concrete release the temporary erection supports under the bridge and swing the span free on its supports. 609.03.01 B) Lift Loops. Cut all lift loops flush with the top of the precast beam once the beam is placed in the final location and prior to placing steel reinforcement. At locations where lift loops are cut, paint the top of the beam with galvanized or epoxy paint.

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<b>Subsection:</b>	611.03.02 Precast Unit Construction.
<b>Revision:</b>	Replace the first sentence of the subsection with the following: Construct units according to ASTM C1577, replacing <b>Table 1 (Design Requirements for Precast Concrete Box Sections Under Earth, Dead and HL-93 Live Load Conditions)</b> with <b>KY Table 1 (Precast Culvert KYHL-93 Design Table)</b> , and Section 605 with the following exceptions and additions:
<b>Subsection:</b>	613.03.01 Design.
<b>Number:</b>	2)
<b>Revision:</b>	Replace "AASHTO Standard Specifications for Highway Bridges" with "AASHTO LRFD Bridge Design Specifications"
<b>Subsection:</b>	615.06.02
<b>Revision:</b>	Add the following sentence to the end of the subsection. The ends of units shall be normal to walls and centerline except exposed edges shall be beveled ¾ inch.
<b>Subsection:</b>	615.06.03 Placement of Reinforcement in Precast 3-Sided Units.
<b>Revision:</b>	Replace the reference of 6.6 in the section to 615.06.06.
<b>Subsection:</b>	615.06.04 Placement of Reinforcement for Precast Endwalls.
<b>Revision:</b>	Replace the reference of 6.7 in the section to 615.06.07.
<b>Subsection:</b>	615.06.06 Laps, Welds, and Spacing for Precast 3-Sided Units.
<b>Revision:</b>	Replace the subsection with the following: Tension splices in the circumferential reinforcement shall be made by lapping. Laps may not be tack welded together for assembly purposes. For smooth welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.2 and AASHTO 2012 Bridge Design Guide Section 5.11.6.3. For deformed welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.1 and AASHTO 2012 Bridge Design Guide Section 5.11.6.2. The overlap of welded wire fabric shall be measured between the outer most longitudinal wires of each fabric sheet. For deformed billet-steel bars, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.1. For splices other than tension splices, the overlap shall be a minimum of 12" for welded wire fabric or deformed billet-steel bars. The spacing center to center of the circumferential wires in a wire fabric sheet shall be no less than 2 inches and no more than 4 inches. The spacing center to center of the longitudinal wires shall not be more than 8 inches. The spacing center to center of the longitudinal distribution steel for either line of reinforcing in the top slab shall be not more than 16 inches.
<b>Subsection:</b>	615.06.07 Laps, Welds, and Spacing for Precast Endwalls.
<b>Revision:</b>	Replace the subsection with the following: Splices in the reinforcement shall be made by lapping. Laps may not be tack welded together for assembly purposes. For smooth welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.2 and AASHTO 2012 Bridge Design Guide Section 5.11.6.3. For deformed welded wire fabric, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.5.1 and AASHTO 2012 Bridge Design Guide Section 5.11.6.2. For deformed billet-steel bars, the overlap shall meet the requirements of AASHTO 2012 Bridge Design Guide Section 5.11.2.1. The spacing center-to-center of the wire fabric sheet shall not be less than 2 inches or more than 8 inches.

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<b>Subsection:</b>	615.08.01 Type of Test Specimen.
<b>Revision:</b>	Replace the subsection with the following: Start-up slump, air content, unit weight, and temperature tests will be performed each day on the first batch of concrete. Acceptable start-up results are required for production of the first unit. After the first unit has been established, random acceptance testing is performed daily for each 50 yd <sup>3</sup> (or fraction thereof). In addition to the slump, air content, unit weight, and temperature tests, a minimum of one set of cylinders shall be required each time plastic property testing is performed.
<b>Subsection:</b>	615.08.02 Compression Testing.
<b>Revision:</b>	Delete the second sentence.
<b>Subsection:</b>	615.08.04 Acceptability of Core Tests.
<b>Revision:</b>	Delete the entire subsection.
<b>Subsection:</b>	615.12 Inspection.
<b>Revision:</b>	Add the following sentences to the end of the subsection: Units will arrive at jobsite with the "Kentucky Oval" stamped on the unit which is an indication of acceptable inspection at the production facility. Units shall be inspected upon arrival for any evidence of damage resulting from transport to the jobsite.
<b>Subsection:</b>	701.04.16 Deduction for Pipe Deflection.
<b>Revision:</b>	Insert the following at the end of the paragraph: The section length is determined by the length of the pipe between joints where the failure occurred.
<b>Subsection:</b>	716.02.02 Paint.
<b>Revision:</b>	Replace sentence with the following: Conform to Section 821.
<b>Subsection:</b>	716.03 CONSTRUCTION.
<b>Revision:</b>	Replace bullet 5) with the following: 5) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims,
<b>Subsection:</b>	716.03.02 Lighting Standard Installation.
<b>Revision:</b>	Replace the second sentence with the following: Regardless of the station and offset noted, locate all poles/bases behind the guardrail a minimum of four feet from the front face of the guardrail to the front face of the pole base.
<b>Subsection:</b>	716.03.02 Lighting Standard Installation.
<b>Part:</b>	A) Conventional Installation.
<b>Revision:</b>	Replace the third sentence with the following: Orient the transformer base so the door is positioned on the side away from on-coming traffic.
<b>Subsection:</b>	716.03.02 Lighting Standard Installation.
<b>Part:</b>	A) Conventional Installation.
<b>Number:</b>	1) Breakaway Installation and Requirements.
<b>Revision:</b>	Replace the first sentence with the following: For breakaway supports, conform to Section 12 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.
<b>Subsection:</b>	716.03.02 Lighting Standard Installation.
<b>Part:</b>	B) High Mast Installation
<b>Revision:</b>	Replace the first sentence with the following: Install each high mast pole as noted on plans.

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<b>Subsection:</b>	716.03.02 Lighting Standard Installation.
<b>Part:</b>	B) High Mast Installation
<b>Number:</b>	2) Concrete Base Installation
<b>Revision:</b>	Modification of Chart and succeeding paragraphs within this section:

Drilled Shaft Depth Data							
Level Ground		3:1 Ground Slope		2:1 Ground Slope		1.5:1 Ground Slope <sup>(2)</sup>	
Soil	Rock	Soil	Rock	Soil	Rock	Soil	Rock
17 ft	7 ft	19 ft	7 ft	20 ft	7 ft	(1)	7 ft

Steel Requirements			
Vertical Bars		Ties or Spiral	
Size	Total	Size	Spacing or Pitch
#10	16	#4	12 inch

(1): Shaft length is 22' for cohesive soil only. For cohesionless soil, contact geotechnical branch for design.

(2): Do not construct high mast drilled shafts on ground slopes steeper than 1.5:1 without the approval of the Division of Traffic.

If rock is encountered during drilling operations and confirmed by the engineer to be of sound quality, the shaft is only required to be further advanced into the rock by the length of rock socket shown in the table. The total length of the shaft need not be longer than that of soil alone. Both longitudinal rebar length and number of ties or spiral length shall be adjusted accordingly.

If a shorter depth is desired for the drilled shaft, the contractor shall provide, for the state's review and approval, a detailed column design with individual site specific soil and rock analysis performed and approved by a Professional Engineer licensed in the Commonwealth of Kentucky.

Spiral reinforcement may be substituted for ties. If spiral reinforcement is used, one and one-half closed coils shall be provided at the ends of each spiral unit. Subsurface conditions consisting of very soft clay or very loose saturated sand could result in soil parameters weaker than those assumed. Engineer shall consult with the geotechnical branch if such conditions are encountered.

The bottom of the drilled hole shall be firm and thoroughly cleaned so no loose or compressible materials are present at the time of the concrete placement. If the drilled hole contains standing water, the concrete shall be placed using a tremie to displace water. Continuous concrete flow will be required to insure full displacement of any water.

The reinforcement and anchor bolts shall be adequately supported in the proper positions so no movement occurs during concrete placement. Welding of anchor bolts to the reinforcing cage is unacceptable, templates shall be used. Exposed portions of the foundation shall be formed to create a smooth finished surface. All forming shall be removed upon completion of foundation construction.

<b>Subsection:</b>	716.03.03 Trenching.
<b>Part:</b>	A) Trenching of Conduit for Highmast Ducted Cables.
<b>Revision:</b>	Add the following after the first sentence: If depths greater than 24 inches are necessary, obtain the Engineer's approval and maintain the required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.

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<b>Subsection:</b>	716.03.03 Trenching.
<b>Part:</b>	B) Trenching of Conduit for Non-Highmast Cables.
<b>Revision:</b>	Add the following after the second sentence: If depths greater than 24 inches are necessary for either situation listed previously, obtain the Engineer's approval and maintain the required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.
<b>Subsection:</b>	716.03.10 Junction Boxes.
<b>Revision:</b>	Replace subsection title with the following: Electrical Junction Box.
<b>Subsection:</b>	716.04.07 Pole with Secondary Control Equipment.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished and installed. The Department will not measure mounting the cabinet to the pole, backfilling, restoration, any necessary hardware to anchor pole, or electrical inspection fees, and will consider them incidental to this item of work. The Department will also not measure furnishing and installing electrical service conductors, specified conduits, meter base, transformer, service panel, fused cutout, fuses, lighting arrestors, photoelectrical control, circuit breaker, contactor, manual switch, ground rods, and ground wires and will consider them incidental to this item of work.
<b>Subsection:</b>	716.04.08 Lighting Control Equipment.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished and installed. The Department will not measure constructing the concrete base, excavation, backfilling, restoration, any necessary anchors, or electrical inspection fees, and will consider them incidental to this item of work. The Department will also not measure furnishing and installing electrical service conductors, specified conduits, meter base, transformer, service panel, fused cutout, fuses, lighting arrestors, photoelectrical control, circuit breakers, contactor, manual switch, ground rods, and ground wires and will consider them incidental to this item of work.
<b>Subsection:</b>	716.04.09 Luminaire.
<b>Revision:</b>	Replace the first sentence with the following: The Department will measure the quantity as each individual unit furnished and installed.
<b>Subsection:</b>	716.04.10 Fused Connector Kits.
<b>Revision:</b>	Replace the first sentence with the following: The Department will measure the quantity as each individual unit furnished and installed.
<b>Subsection:</b>	716.04.13 Junction Box.
<b>Revision:</b>	Replace the subsection title with the following: Electrical Junction Box Type Various.
<b>Subsection:</b>	716.04.13 Junction Box.
<b>Part:</b>	A) Junction Electrical.
<b>Revision:</b>	Rename A) Junction Electrical to the following: A) Electrical Junction Box.
<b>Subsection:</b>	716.04.14 Trenching and Backfilling.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, backfilling, underground utility warning tape (if required), the restoration of disturbed areas to original condition, and will consider them incidental to this item of work.

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<b>Subsection:</b>	716.04.18 Remove Lighting.															
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as a lump sum for the removal of lighting equipment. The Department will not measure the disposal of all equipment and materials off the project by the contractor. The Department also will not measure the transportation of the materials and will consider them incidental to this item of work.															
<b>Subsection:</b>	716.04.20 Bore and Jack Conduit.															
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity in linear feet. This item shall include all work necessary for boring and installing conduit under an existing roadway. Construction methods shall be in accordance with Sections 706.03.02, paragraphs 1, 2, and 4.															
<b>Subsection:</b>	716.05 PAYMENT.															
<b>Revision:</b>	Replace items 04810-04811, 20391NS835 and, 20392NS835 under <u>Code</u> , <u>Pay Item</u> , and <u>Pay Unit</u> with the following:															
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<b>Subsection:</b>	723.02.02 Paint.															
<b>Revision:</b>	Replace sentence with the following: Conform to Section 821.															
<b>Subsection:</b>	723.03 CONSTRUCTION.															
<b>Revision:</b>	Replace bullet 5) with the following: 5) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims,															
<b>Subsection:</b>	723.03.02 Poles and Bases Installation.															
<b>Revision:</b>	Replace the first sentence with the following: Regardless of the station and offset noted, locate all poles/bases behind the guardrail a minimum of four feet from the front face of the guardrail to the front face of the pole base.															
<b>Subsection:</b>	723.03.02 Poles and Bases Installation.															
<b>Part:</b>	A) Steel Strain and Mastarm Poles Installation															
<b>Revision:</b>	Replace the second paragraph with the following: For concrete base installation, see Section 716.03.02, B), 2), Paragraphs 2-7. Drilled shaft depth shall be based on the soil conditions encountered during drilling and slope condition at the site. Refer to the design chart below:															
<b>Subsection:</b>	723.03.02 Poles and Bases Installation.															
<b>Part:</b>	B) Pedestal or Pedestal Post Installation.															
<b>Revision:</b>	Replace the fourth sentence of the paragraph with the following: For breakaway supports, conform to Section 12 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.															

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<b>Subsection:</b>	723.03.03 Trenching.
<b>Part:</b>	A) Under Roadway.
<b>Revision:</b>	Add the following after the second sentence: If depths greater than 24 inches are necessary, obtain the Engineer's approval and maintain ether required conduit depths coming into the junction boxes. No payment for additional junction boxes for greater depths will be allowed.
<b>Subsection:</b>	723.03.11 Wiring Installation.
<b>Revision:</b>	Add the following sentence between the fifth and sixth sentences: Provide an extra two feet of loop wire and lead-in past the installed conduit in poles, pedestals, and junction boxes.
<b>Subsection:</b>	723.03.12 Loop Installation.
<b>Revision:</b>	Replace the fourth sentence of the 2nd paragraph with the following: Provide an extra two feet of loop wire and lead-in past the installed conduit in poles, pedestals, and junction boxes.
<b>Subsection:</b>	723.04.02 Junction Box.
<b>Revision:</b>	Replace subsection title with the following: Electrical Junction Box Type Various.
<b>Subsection:</b>	723.04.03 Trenching and Backfilling.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, backfilling, underground utility warning tape (if required), the restoration of disturbed areas to original condition, and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.10 Signal Pedestal.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, specified conduits, fittings, ground rod, ground wire, backfilling, restoring disturbed areas, or other necessary hardware and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.15 Loop Saw Slot and Fill.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure sawing, cleaning and filling induction loop saw slot, loop sealant, backer rod, and grout and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.16 Pedestrian Detector.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished, installed and connected to pole/pedestal. The Department will not measure installing R10-3e (with arrow) sign, furnishing and installing mounting hardware for sign and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.18 Signal Controller- Type 170.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure constructing the concrete base or mounting the cabinet to the pole, connecting the signal and detectors, excavation, backfilling, restoration, any necessary pole mounting hardware, electric service, or electrical inspection fees and will consider them incidental to this item of work. The Department will also not measure furnishing and connecting the induction of loop amplifiers, pedestrian isolators, load switches, model 400 modem card; furnishing and installing electrical service conductors, specified conduits, anchors, meter base, fused cutout, fuses, ground rods, ground wires and will consider them incidental to this item of work.

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<b>Subsection:</b>	723.04.20 Install Signal Controller - Type 170.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as each individual unit installed. The Department will not measure constructing the concrete base or mounting the cabinet to the pole, connecting the signal and detectors, and excavation, backfilling, restoration, any necessary pole mounting hardware, electric service, or electrical inspection fees and will consider them incidental to this item of work. The Department will also not measure connecting the induction loop amplifiers, pedestrian, isolators, load switches, model 400 modem card; furnishing and installing electrical service conductors, specified conduits, anchors, meter base, fused cutout, fuses, ground rods, ground wires and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.22 Remove Signal Equipment.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as a lump sum removal of signal equipment. The Department will not measure the return of control equipment and signal heads to the Department of Highways as directed by the District Traffic Engineer. The Department also will not measure the transportation of materials of the disposal of all other equipment and materials off the project by the contractor and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.28 Install Pedestrian Detector Audible.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure installing sign R10-3e (with arrow) and will consider it incidental to this item of work.
<b>Subsection:</b>	723.04.29 Audible Pedestrian Detector.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure furnishing and installing the sign R10-3e (with arrow) and will consider it incidental to this item of work.
<b>Subsection:</b>	723.04.30 Bore and Jack Conduit.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity in linear feet. This item shall include all work necessary for boring and installing conduit under an existing roadway. Construction methods shall be in accordance with Sections 706.03.02, paragraphs 1, 2, and 4.
<b>Subsection:</b>	723.04.31 Install Pedestrian Detector.
<b>Revision:</b>	Replace the paragraph with the following: The Department will measure the quantity as each individual unit installed and connected to pole/pedestal. The Department will not measure installing sign R 10-3e (with arrow) and will consider it incidental to this item of work.
<b>Subsection:</b>	723.04.32 Install Mast Arm Pole.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure arms, signal mounting brackets, anchor bolts, or any other necessary hardware and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.33 Pedestal Post.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, conduit, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.

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<b>Subsection:</b>	723.04.36 Traffic Signal Pole Base.															
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, reinforcing steel, anchor bolts, specified conduits, ground rods, ground wires, backfilling, or restoration and will consider them incidental to this item of work.															
<b>Subsection:</b>	723.04.37 Install Signal Pedestal.															
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, specified conduits, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.															
<b>Subsection:</b>	723.04.38 Install Pedestal Post.															
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure excavation, concrete, reinforcing steel, anchor bolts, specified conduits, fittings, ground rod, ground wire, backfilling, restoration, or any other necessary hardware and will consider them incidental to this item of work.															
<b>Subsection:</b>	723.05 PAYMENT.															
<b>Revision:</b>	Replace items 04810-04811, 20391NS835 and, 20392NS835 under <u>Code</u> , <u>Pay Item</u> , and <u>Pay Unit</u> with the following:															
	<table border="0"> <thead> <tr> <th><u>Code</u></th> <th><u>Pay Item</u></th> <th><u>Pay Unit</u></th> </tr> </thead> <tbody> <tr> <td>04810</td> <td>Electrical Junction Box</td> <td>Each</td> </tr> <tr> <td>04811</td> <td>Electrical Junction Box Type B</td> <td>Each</td> </tr> <tr> <td>20391NS835</td> <td>Electrical Junction Box Type A</td> <td>Each</td> </tr> <tr> <td>20392NS835</td> <td>Electrical Junction Box Type C</td> <td>Each</td> </tr> </tbody> </table>	<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>	04810	Electrical Junction Box	Each	04811	Electrical Junction Box Type B	Each	20391NS835	Electrical Junction Box Type A	Each	20392NS835	Electrical Junction Box Type C	Each
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20391NS835	Electrical Junction Box Type A	Each														
20392NS835	Electrical Junction Box Type C	Each														
<b>Subsection:</b>	804.01.02 Crushed Sand.															
<b>Revision:</b>	Delete last sentence of the section.															
<b>Subsection:</b>	804.01.06 Slag.															
<b>Revision:</b>	Add subsection and following sentence. Provide blast furnace slag sand where permitted. The Department will allow steel slag sand only in asphalt surface applications.															
<b>Subsection:</b>	804.04 Asphalt Mixtures.															
<b>Revision:</b>	Replace the subsection with the following: Provide natural, crushed, conglomerate, or blast furnace slag sand, with the addition of filler as necessary, to meet gradation requirements. The Department will allow any combination of natural, crushed, conglomerate or blast furnace slag sand when the combination is achieved using cold feeds at the plant. The Engineer may allow other fine aggregates.															
<b>Subsection:</b>	806.03.01 General Requirements.															
<b>Revision:</b>	Replace the second sentence of the paragraph with the following: Additionally, the material must have a minimum solubility of 99.0 percent when tested according to AASHTO T 44 and PG 76-22 must exhibit a minimum recovery of 60 percent, with a J <sub>NR</sub> (nonrecoverable creep compliance) between 0.1 and 0.5, when tested according to AASHTO TP 70.															

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<b>Subsection:</b>	806.03.01 General Requirements.														
<b>Table:</b>	PG Binder Requirements and Price Adjustment Schedule														
<b>Revision:</b>	Replace the Elastic Recovery, % <sup>(3)</sup> (AASHTO T301) and all corresponding values in the table with the following:														
	<table border="1"> <thead> <tr> <th><u>Test</u></th> <th><u>Specification</u></th> <th><u>100% Pay</u></th> <th><u>90% Pay</u></th> <th><u>80% Pay</u></th> <th><u>70% Pay</u></th> <th><u>50% Pay<sup>(1)</sup></u></th> </tr> </thead> <tbody> <tr> <td>MSCR recovery, % <sup>(3)</sup> (AASHTO TP 70)</td> <td>60 Min.</td> <td>≥58</td> <td>56</td> <td>55</td> <td>54</td> <td>&lt;53</td> </tr> </tbody> </table>	<u>Test</u>	<u>Specification</u>	<u>100% Pay</u>	<u>90% Pay</u>	<u>80% Pay</u>	<u>70% Pay</u>	<u>50% Pay<sup>(1)</sup></u>	MSCR recovery, % <sup>(3)</sup> (AASHTO TP 70)	60 Min.	≥58	56	55	54	<53
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<b>Subsection:</b>	806.03.01 General Requirements.														
<b>Table:</b>	PG Binder Requirements and Price Adjustment Schedule														
<b>Superscript:</b>	(3)														
<b>Revision:</b>	Replace <sup>(3)</sup> with the following: Perform testing at 64°C.														
<b>Subsection:</b>	813.04 Gray Iron Castings.														
<b>Revision:</b>	Replace the reference to "AASHTO M105" with "ASTM A48".														
<b>Subsection:</b>	813.09.02 High Strength Steel Bolts, Nuts, and Washers.														
<b>Number:</b>	A) Bolts.														
<b>Revision:</b>	Delete first paragraph and "Hardness Number" Table. Replace with the following: A) Bolts. Conform to ASTM A325 (AASHTO M164) or ASTM A490 (AASHTO 253) as applicable.														
<b>Subsection:</b>	814.04.02 Timber Guardrail Posts.														
<b>Revision:</b>	Third paragraph, replace the reference to "AWPA C14" with "AWPA U1, Section B, Paragraph 4.1".														
<b>Subsection:</b>	814.04.02 Timber Guardrail Posts.														
<b>Revision:</b>	Replace the first sentence of the fourth paragraph with the following: Use any of the species of wood for round or square posts covered under AWPA U1.														
<b>Subsection:</b>	814.04.02 Timber Guardrail Posts.														
<b>Revision:</b>	Fourth paragraph, replace the reference to "AWPA C2" with "AWPA U1, Section B, Paragraph 4.1".														
<b>Subsection:</b>	814.04.02 Timber Guardrail Posts.														
<b>Revision:</b>	Delete the second sentence of the fourth paragraph.														
<b>Subsection:</b>	814.05.02 Composite Plastic.														
<b>Revision:</b>	1) Add the following to the beginning of the first paragraph: Select composite offset blocks conforming to this section and assure blocks are from a manufacturer included on the Department's List of Approved Materials. 2) Delete the last paragraph of the subsection.														
<b>Subsection:</b>	816.07.02 Wood Posts and Braces.														
<b>Revision:</b>	First paragraph, replace the reference to "AWPA C5" with "AWPA U1, Section B, Paragraph 4.1".														
<b>Subsection:</b>	816.07.02 Wood Posts and Braces.														
<b>Revision:</b>	Delete the second sentence of the first paragraph.														
<b>Subsection:</b>	818.07 Preservative Treatment.														
<b>Revision:</b>	First paragraph, replace all references to "AWPA C14" with "AWPA U1, Section A".														

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<p><b>Subsection:</b> <b>Revision:</b></p>	<p>834.14 Lighting Poles.        Replace the first sentence with the following: Lighting pole design shall be in accordance with loading and allowable stress requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims, with the exception of the following: The Cabinet will waive the requirement stated in the first sentence of Section 5.14.6.2 – Reinforced Holes and Cutouts for high mast poles (only). The minimum diameter at the base of the pole shall be 22 inches for high mast poles (only).</p>
<p><b>Subsection</b> <b>Revision:</b></p>	<p>834.14.03 High Mast Poles.        Remove the second and fourth sentence from the first paragraph.</p>
<p><b>Subsection</b> <b>Revision:</b></p>	<p>834.14.03 High Mast Poles.        Replace the third paragraph with the following: Provide calculations and drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky.</p>
<p><b>Subsection:</b> <b>Revision:</b></p>	<p>834.14.03 High Mast Poles.        Replace paragraph six with the following: Provide a pole section that conforms to ASTM A 595 grade A with a minimum yield strength of 55 KSI or ASTM A 572 with a minimum yield strength of 55 KSI. Use tubes that are round or 16 sided with a four inch corner radius, have a constant linear taper of .144 in/ft and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Provide pole sections that are telescopically slip fit assembled in the field to facilitate inspection of interior surface welds and the protective coating. The minimum length of the telescopic slip splices shall be 1.5 times the inside diameter of the exposed end of the female section. Use longitudinal seam welds as commended in Section 5.15 of the AASHTO 2013 Specifications. The thickness of the transverse base shall not be less than 2 inches. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration groove weld with backup bar. The handhole cover shall be removable from the handhole frame. One the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department’s standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM A 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7-guage stainless steel to provide adjustability to insure weather-tight fit for the cover. The minimum clear distance between the transverse plate and the bottom opening of the handhole shall not be less than the diameter of the bottom tube of the pole but needs to be at least 15 inches. Provide products that are hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A 153 (hardware items).</p>
<p><b>Subsection:</b> <b>Revision:</b></p>	<p>834.16 ANCHOR BOLTS.        Insert the following sentence at the beginning of the paragraph: The anchor bolt design shall follow the NCHRP Report 494 Section 2.4 and NCHRP 469 Appendix A Specifications.</p>

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<b>Subsection:</b>	834.17.01 Conventional.
<b>Revision:</b>	Add the following sentence after the second sentence: Provide a waterproof sticker mounted on the bottom of the housing that is legible from the ground and indicates the wattage of the fixture by providing the first two numbers of the wattage.
<b>Subsection:</b>	834.21.01 Waterproof Enclosures.
<b>Revision:</b>	Replace the last five sentences in the second paragraph with the following sentences: Provide a cabinet door with a louvered air vent, filter-retaining brackets and an easy to clean metal filter. Provide a cabinet door that is keyed with a factory installed standard no. 2 corbin traffic control key. Provide a light fixture with switch and bulb. Use a 120-volt fixture and utilize a L.E.D. bulb (equivalent to 60 watts minimum). Fixture shall be situated at or near the top of the cabinet and illuminate the contents of the cabinet. Provide a 120 VAC GFI duplex receptacle in the enclosure with a separate 20 amp breaker.
<b>Subsection:</b>	835.07 Traffic Poles.
<b>Revision:</b>	Replace the first sentence of the first paragraph with the following: Pole diameter and wall thickness shall be calculated in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.
<b>Subsection:</b>	835.07 Traffic Poles.
<b>Revision:</b>	*Replace the first sentence of the fourth paragraph with the following: Ensure transverse plates have a thickness $\geq 2$ inches. *Add the following sentence to the end of the fourth paragraph: The bottom pole diameter shall not be less than 16.25 inches.
<b>Subsection:</b>	835.07 Traffic Poles.
<b>Revision:</b>	Replace the third sentence of the fifth paragraph with the following: For anchor bolt design, pole forces shall be positioned in such a manner to maximize the force on any individual anchor bolt regardless of the actual anchor bolt orientation with the pole.
<b>Subsection:</b>	835.07 Traffic Poles.
<b>Revision:</b>	Replace the first and second sentence of the sixth paragraph with the following: The pole handhole shall be 25 inches by 6.5 inches. The handhole cover shall be removable from the handhole frame. On the frame side opposite the hinge, provide a mechanism on the handhole cover/frame to place the Department's standard padlock as specified in Section 834.25. The handhole frame shall have two stainless studs installed opposite the hinge to secure the handhole cover to the frame which includes providing stainless steel wing nuts and washers. The handhole cover shall be manufactured from 0.25 inch thick galvanized steel (ASTM 153) and have a neoprene rubber gasket that is permanently secured to the handhole frame to insure weather-tight protection. The hinge shall be manufactured from 7 gauge stainless steel to provide adjustability to insure a weather-tight fit for the cover. The minimum clear distance between the transverse plate and the bottom opening of the handhole shall not be less than the diameter of the bottom tube but needs to be at least 12 inches.

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<b>Subsection:</b>	835.07 Traffic Poles.									
<b>Revision:</b>	*Replace the first sentence of the last paragraph with the following: Provide calculations and drawings that are stamped by a Professional Engineer licensed in the Commonwealth of Kentucky. *Replace the third sentence of the last paragraph with the following: All tables referenced in 835.07 are found in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 2013-6th Edition with current interims.									
<b>Subsection:</b>	835.07.01 Steel Strain Poles.									
<b>Revision:</b>	Replace the second sentence of the second paragraph with the following: The detailed analysis shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.									
<b>Subsection:</b>	835.07.01 Steel Strain Poles.									
<b>Revision:</b>	Replace number 7. after the second paragraph with the following: 7. Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from table 11.9.3.1-1.									
<b>Subsection:</b>	835.07.02 Mast Arm Poles.									
<b>Revision:</b>	Replace the second sentence of the fourth paragraph with the following: The detailed analysis shall be certified by a Professional Engineer licensed in the Commonwealth of Kentucky.									
<b>Subsection:</b>	835.07.02 Mast Arm Poles.									
<b>Revision:</b>	Replace number 7) after the fourth paragraph with the following: 7) Fatigue calculations should be shown for all fatigue related connections. Provide the corresponding detail, stress category and example from table 11.9.3.1-1.									
<b>Subsection:</b>	835.07.03 Anchor Bolts.									
<b>Revision:</b>	Add the following to the end of the paragraph: There shall be two steel templates (one can be used for the headed part of the anchor bolt when designed in this manner) provided per pole. Templates shall be contained within a 26.5 inch diameter. All templates shall be fully galvanized (ASTM A 153).									
<b>Subsection:</b>	835.16.05 Optical Units.									
<b>Revision:</b>	Replace the 3rd paragraph with the following: The list of certified products can be found on the following website: <a href="http://www.intertek.com">http://www.intertek.com</a> .									
<b>Subsection:</b>	835.19.01 Pedestrian Detector Body.									
<b>Revision:</b>	Replace the first sentence with the following: Provide a four holed pole mounted aluminum rectangular housing that is compatible with the pedestrian detector.									
<b>Subsection:</b>	843.01.01 Geotextile Fabric.									
<b>Table:</b>	TYPE I FABRIC GEOTEXTILES FOR SLOPE PROTECTION AND CHANNEL LINING									
<b>Revision:</b>	Add the following to the chart:									
	<table border="1"> <thead> <tr> <th><u>Property</u></th> <th><u>Minimum Value<sup>(1)</sup></u></th> <th><u>Test Method</u></th> </tr> </thead> <tbody> <tr> <td>CBR Puncture (lbs)</td> <td>494</td> <td>ASTM D6241</td> </tr> <tr> <td>Permittivity (1/s)</td> <td>0.7</td> <td>ASTM D4491</td> </tr> </tbody> </table>	<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>	CBR Puncture (lbs)	494	ASTM D6241	Permittivity (1/s)	0.7	ASTM D4491
<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>								
CBR Puncture (lbs)	494	ASTM D6241								
Permittivity (1/s)	0.7	ASTM D4491								

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<b>Subsection:</b>	843.01.01 Geotextile Fabric.		
<b>Table:</b>	TYPE II FABRIC GEOTEXTILES FOR UNDERDRAINS		
<b>Revision:</b>	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>
	CBR Puncture (lbs)	210	ASTM D6241
	Permittivity (1/s)	0.5	ASTM D4491
<b>Subsection:</b>	843.01.01 Geotextile Fabric.		
<b>Table:</b>	TYPE III FABRIC GEOTEXTILES FOR SUBGRADE OR EMBANKMENT STABILIZATION		
<b>Revision:</b>	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>
	CBR Puncture (lbs)	370	ASTM D6241
	Permittivity (1/s)	0.05	ASTM D4491
<b>Subsection:</b>	843.01.01 Geotextile Fabric.		
<b>Table:</b>	TYPE IV FABRIC GEOTEXTILES FOR EMBANKMENT DRAINAGE BLANKETS AND PAVEMENT EDGE DRAINS		
<b>Revision:</b>	Add the following to the chart:		
	<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>
	CBR Puncture (lbs)	309	ASTM D6241
	Permittivity (1/s)	0.5	ASTM D4491
<b>Subsection:</b>	843.01.01 Geotextile Fabric.		
<b>Table:</b>	TYPE V HIGH STRENGTH GEOTEXTILE FABRIC		
<b>Revision:</b>	Make the following changes to the chart:		
	<u>Property</u>	<u>Minimum Value<sup>(1)</sup></u>	<u>Test Method</u>
	CBR Puncture (lbs)	618	ASTM D6241
	Apparent Opening Size	U.S. #40 <sup>(3)</sup>	ASTM D4751
	<sup>(3)</sup> Maximum average roll value.		

### **SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS**

This Special Note will apply when indicated on the plans or in the proposal.

**1.0 DESCRIPTION.** Furnish, install, operate, and maintain variable message signs at the locations shown on the plans or designated by the Engineer. Remove and retain possession of variable message signs when they are no longer needed on the project.

### **2.0 MATERIALS.**

**2.1 General.** Use LED Variable Message Signs Class I, II, or III, as appropriate, from the Department's List of Approved Materials.

Unclassified signs may be submitted for approval by the Engineer. The Engineer may require a daytime and nighttime demonstration. The Engineer will make a final decision within 30 days after all required information is received.

### **2.2 Sign and Controls.** All signs must:

- 1) Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
- 2) Provide at least 40 preprogrammed messages available for use at any time. Provide for quick and easy change of the displayed message; editing of the message; and additions of new messages.
- 3) Provide a controller consisting of:
  - a) Keyboard or keypad.
  - b) Readout that mimics the actual sign display. (When LCD or LCD type readout is used, include backlighting and heating or otherwise arrange for viewing in cold temperatures.)
  - c) Non-volatile memory or suitable memory with battery backup for storing pre-programmed messages.
  - d) Logic circuitry to control the sequence of messages and flash rate.
- 4) Provide a serial interface that is capable of supporting complete remote control ability through land line and cellular telephone operation. Include communication software capable of immediately updating the message, providing complete sign status, and allowing message library queries and updates.
- 5) Allow a single person easily to raise the sign to a satisfactory height above the pavement during use, and lower the sign during travel.
- 6) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
- 7) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
- 8) Provide the driver board as part of a module. All modules are interchangeable, and have plug and socket arrangements for disconnection and reconnection. Printed circuit boards associated with driver boards have a conformable coating to protect against moisture.
- 9) Provide a sign case sealed against rain, snow, dust, insects, etc. The lens is UV stabilized clear plastic (polycarbonate, acrylic, or other approved material) angled to prevent glare.
- 10) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
- 11) Provide a photocell control to provide automatic dimming.

- 12) Allow an on-off flashing sequence at an adjustable rate.
- 13) Provide a sight to aim the message.
- 14) Provide a LED display color of approximately 590 nm amber.
- 15) Provide a controller that is password protected.
- 16) Provide a security device that prevents unauthorized individuals from accessing the controller.
- 17) Provide the following 3-line messages preprogrammed and available for use when the sign unit begins operation:

/KEEP/RIGHT/=>=>=>/	/MIN/SPEED/**MPH/
/KEEP/LEFT/<=<=</	/ICY/BRIDGE/AHEAD/ /ONE
/LOOSE/GRAVEL/AHEAD/	LANE/BRIDGE/AHEAD/
/RD WORK/NEXT/**MILES/	/ROUGH/ROAD/AHEAD/
/TWO WAY/TRAFFIC/AHEAD/	/MERGING/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/	/NEXT/***/MILES/
/REDUCE/SPEED/**MPH/	/HEAVY/TRAFFIC/AHEAD/
/BRIDGE/WORK/***0 FT/	/SPEED/LIMIT/**MPH/
/MAX/SPEED/**MPH/	/BUMP/AHEAD/
/SURVEY/PARTY/AHEAD/	/TWO/WAY/TRAFFIC/

\*Insert numerals as directed by the Engineer.  
Add other messages during the project when required by the Engineer.

**2.3 Power.**

- 1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. Provide direct wiring for operation of the sign or arrow board from an external power source to provide energy backup for 21 days without sunlight and an on-board system charger with the ability to recharge completely discharged batteries in 24 hours.

**3.0 CONSTRUCTION.** Furnish and operate the variable message signs as designated on the plans or by the Engineer. Ensure the bottom of the message panel is a minimum of 7 feet above the roadway in urban areas and 5 feet above in rural areas when operating. Use Class I, II, or III signs on roads with a speed limit less than 55 mph. Use Class I or II signs on roads with speed limits 55 mph or greater.

Maintain the sign in proper working order, including repair of any damage done by others, until completion of the project. When the sign becomes inoperative, immediately repair or replace the sign. Repetitive problems with the same unit will be cause for rejection and replacement.

Use only project related messages and messages directed by the Engineer, unnecessary messages lessen the impact of the sign. Ensure the message is displayed in either one or 2 phases with each phase having no more than 3 lines of text. When no message is needed, but it is necessary to know if the sign is operable, flash only a pixel.

When the sign is not needed, move it outside the clear zone or where the Engineer directs. Variable Message Signs are the property of the Contractor and shall be removed from the project when no longer needed. The Department will not assume ownership of these signs.

**4.0 MEASUREMENT.** The final quantity of Variable Message Sign will be

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the actual number of individual signs acceptably furnished and operated during the project. The Department will not measure signs replaced due to damage or rejection.

**5.0 PAYMENT.** The Department will pay for the Variable Message Signs at the unit price each. The Department will not pay for signs replaced due to damage or rejection. Payment is full compensation for furnishing all materials, labor, equipment, and service necessary to, operate, move, repair, and maintain or replace the variable message signs. The Department will make payment for the completed and accepted quantities under the following:

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

6J

### SPECIAL NOTE FOR NON-EPOXY ADHESIVES

This Special Note will apply where indicated on the plans or in the proposal. Section references herein are to the Department's 2012 Standard Specifications for Road and Bridge Construction.

**1.0 DESCRIPTION.** As an alternate to Type IV epoxy, as specified in Subsection 826.01.02, the Department may allow other structural adhesives for doweling deformed reinforcing bars into hardened concrete providing the requirements herein are met.

**2.0 MATERIALS.** Furnish an adhesive material from the Department's List of Approved Materials. Submit one cartridge of each component per project to the Engineer for infrared analysis.

**3.0 CONSTRUCTION.** Do not use the material until the Engineer verifies, by visual inspection, that the material is from the List of Approved Materials.

**3.1 Field Installation.** Follow the following installation criteria:

- 1) Drill a dowel hole that is no more than 1/8 inch larger in diameter than the bar.
- 2) Ensure the dowel hole is dry and free of all drill and coring dust.
- 3) Place the adhesive in the dowel hole according to the manufacturer's instructions.
- 4) Insert the bar to the bottom of the hole and twist 1/4 turn. An excess amount of adhesive must be clearly visible as an extruded ring of material surrounding the reinforcing bar at the surface of the concrete.

**3.2 Job Site Testing.** Contact the Division of Materials in advance of the installation date to set up a testing schedule. After installation of the first 50 reinforcing bars, the Department will randomly select 5 and proof load according to the following table with zero slippage.

REBAR SIZE (#)	10	13	16	19	22
PROOF LOAD (lbs)	7,000	12,000	19,000	27,000	36,000

If any of the bars fail in bond, either revise the installation procedure, if applicable, or provide another adhesive that is capable of passing this test. The Engineer may require additional job site testing.

**4.0 MEASUREMENT AND PAYMENT.** The Department will not measure the adhesive or its application for payment and will consider it incidental to the reinforcing bars.

December 16, 2013

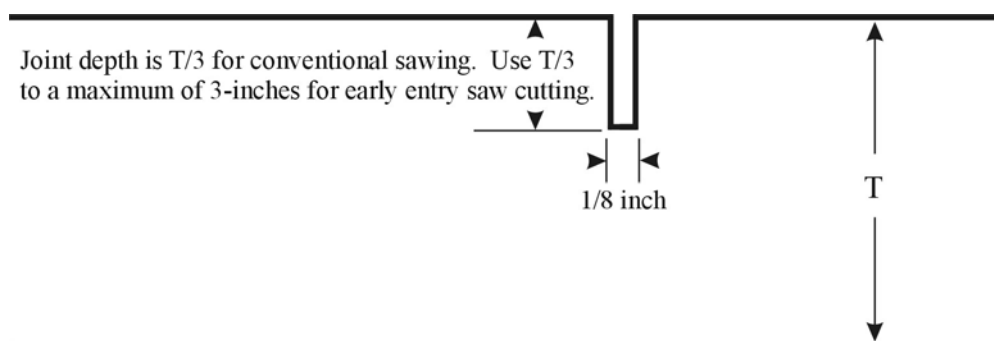
10Y

### SPECIAL NOTE FOR UNSEALED JPC PAVEMENT AND SHOULDER JOINTS

This Special Note will apply when indicated on the plans or in the proposal. Section references herein are to the Department's 2012 Standard Specifications for Road and Bridge Construction.

**1.0 DESCRIPTION.** This Special Note will only apply to concrete pavements placed on a drainage blanket. The Department will allow contraction and construction joints with a joint width of 1/8-inch to be left unsealed. Construct all other pavement joints according to the standard specifications. Seal expansion joints according to the standard specifications.

**2.0 CONSTRUCTION.** Saw the joints in a timely manner in order to control cracking. When using a conventional saw, cut joints to a depth equal to 1/3 of the pavement thickness (T). When using an early entry saw, cut joints to a depth equal to 1/3 of the pavement thickness (T) to a maximum of 3-inches. Do not bevel the edge of the sawed joint. Keep joints clean and free of saw cuttings.



**3.0 MEASUREMENT AND PAYMENT.** The Department will not measure for payment any work associated with this Special Note and will consider it incidental to the bid item(s) JPC Pavement and JPC Shoulders.

June 15, 2012

11H

## **SPECIAL NOTE FOR LANDSCAPING WEED CONTROL MAT (WCM)**

This Special Note will apply where indicated on the plans or in the proposal. Section references herein are to the Department's 2012 Standard Specifications for Road and Bridge Construction.

**1.0 DESCRIPTION.** Install weed control mat (WCM) at locations specified in the Contract or as the Engineer directs.

### **2.0 MATERIALS.**

**2.1 Weed Control Mat.** WCM shall be a commercial weed control product. The mat shall be plastic, rubber composite or polyester fiber and shall prevent sunlight from reaching the soil. The mat shall have a minimum thickness of 0.2 inches. The mat shall contain no herbicides but shall resist ultraviolet light, mildew and algae. The mat shall be self-extinguishing when removed from flame. The WCM shall be provided with pre punched opening for posts when required.

**2.2 Weed Control Mat Collar.** Collar prefabricated by the manufacturer shall be the same material and same thickness as the WCM and shall fit snugly around the post without gaps. If the weed control mat collar is necessary it shall be specified on the project plans.

**2.3 Joiner Strip.** A joiner strip shall be a strip of WCM that is a minimum of 4 inches in width and be the same thickness.

**2.4 Staples.** Staples shall be in accordance with the manufacturer's recommendations. Staples will be able to secure the WCM to another section of WCM and be able to penetrate two thicknesses of material.

**2.5 Caulking.** Caulking material used to seal the WCM material to guardrail posts shall be as specified by the manufacturer. If the manufacturer does not specify use standard silicone sealant.

**2.6 Stakes.** All stakes required to anchor the product to the ground shall be specified by the manufacturer.

**3.0 CONSTRUCTION.** Install according to the Manufacturer's recommendations. When requested by the Engineer, provide a Manufacturer's Representative on-site to oversee and approve the initial installation of the mat. When requested by the Engineer, provide a letter from the Manufacturer approving the installation.

**3.1 Site Preparation.** Areas to receive WCM shall be cleared of trash and debris. Vegetation shall be removed to the ground. Cleared trash, debris and removed vegetation shall be disposed outside of the right of way in accordance with section 202 of the standard specifications. If necessary areas to receive the WCM shall be tamped flat to achieve a smooth surface that will allow the mat to lay as flat as possible without bulges, voids, or wrinkles.

**3.2 Installation.** WCM shall be placed as shown on the plans, beneath and adjacent to guardrail and sign posts. Mats shall be secured in place using materials and spacing specified by the manufacturer and spaced per the manufacturer's specifications. Under no circumstances will

11H

abutted joints be allowed in the WCM. All joints must be overlapped or have a joiner strip that beneath the top surface.

- A) **Installation under Guardrail:** WCM in guardrail areas shall be placed immediately following installation of the guardrail posts, prior to the installation of the rail sections. WCM shall be placed over guardrail posts using the prepunched opening, allowing the mat to be lowered to the ground. Collars shall be placed over guardrail post openings, covering all gaps.

Joints between the guardrail posts, WCM, and mat collars shall be caulked according to manufacturer requirements. The filler material shall be applied around all posts per the manufacturer's recommendations.

WCM shall overlap adjacent paving or dikes by a minimum of 2 inches and trimmed to a straight line. Butt joints between the WCM and adjacent paving will not be allowed. Weed control mat shall be fastened to the adjacent pavement or dike according to manufacturers specifications.

Following completion of the placement of the WCM, collars, staples, stakes, and caulking, the mat surface shall be flat, smooth, and in uniform contact with the soil surface, free of bulges, voids, and wrinkles.

- B) **Installation around sign posts:** The WCM will be installed around sign posts according to the manufacturer specifications. The WCM will be sealed around the posts in the same manner as the guardrail. The WCM shall extend at least two feet beyond each post and be three foot in width.

**4.0 MEASUREMENT.** The Department will measure the quantity of WCM by the square foot of area to be covered. The Department will not measure ground preparation for payment and will consider it incidental to the mat. The Department will consider caulking, crack sealant, staples, mat collars, and staking incidental to the WCM and will not measure them for payment.

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

<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
23962EN11H	Weed Control Mat	Square Foot

The Department will consider payment as full compensation for all work required under this note.

June 15, 2012

## 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 2012 Standard Specifications for Road and Bridge Construction.

**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:

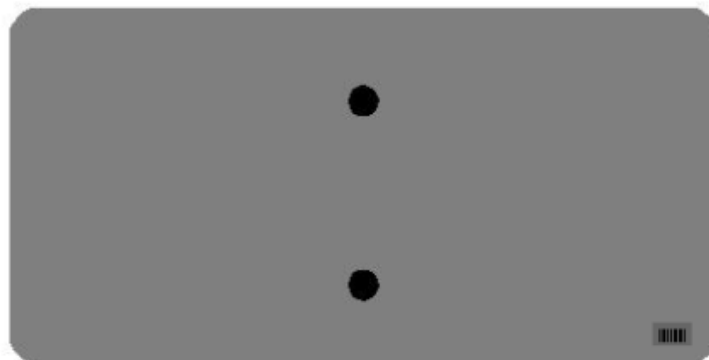
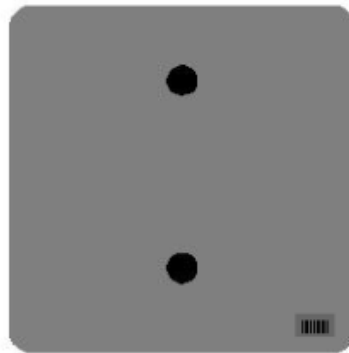
<u>Code</u>	<u>Pay Item</u>	<u>Pay Unit</u>
24631EC	Barcode Sign Inventory	Each

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.

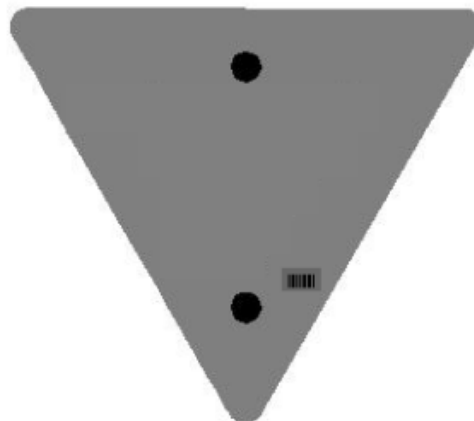
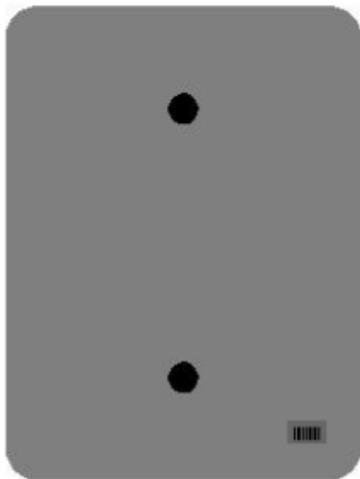
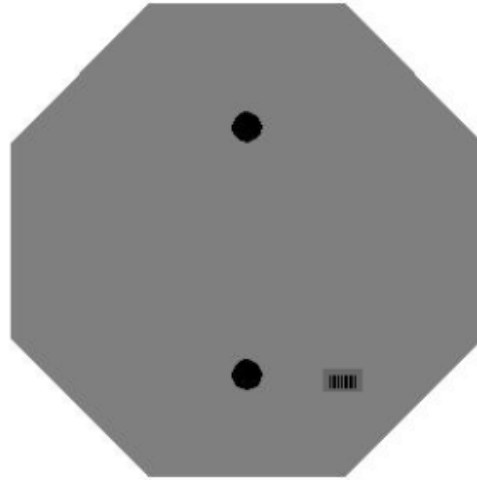
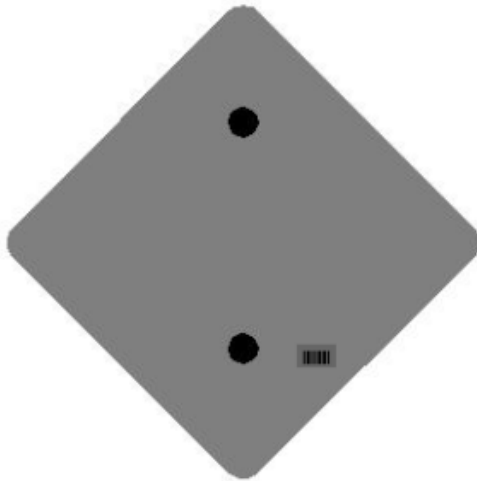
### One Sign Post



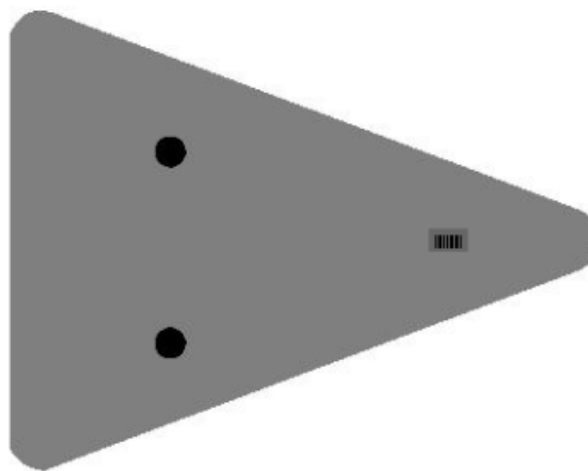
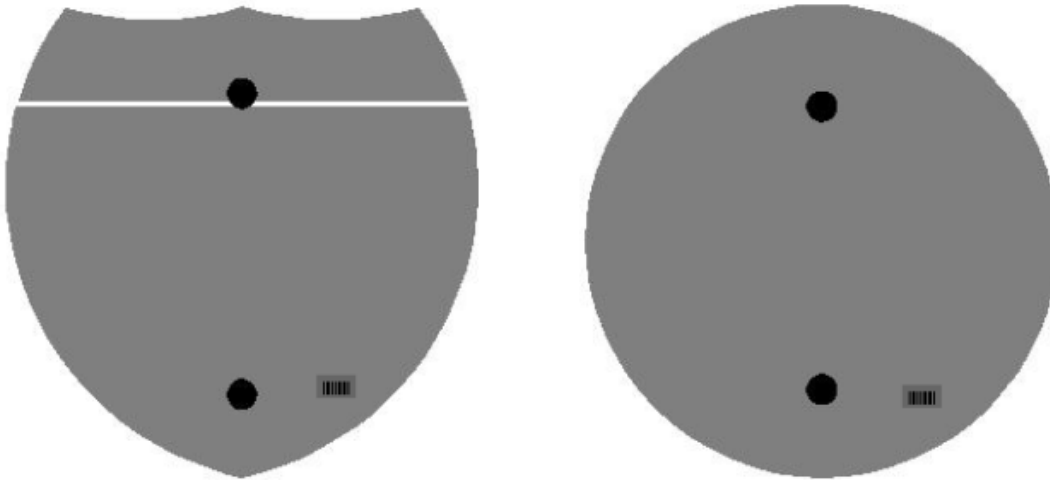
↑  
2" Wide Post



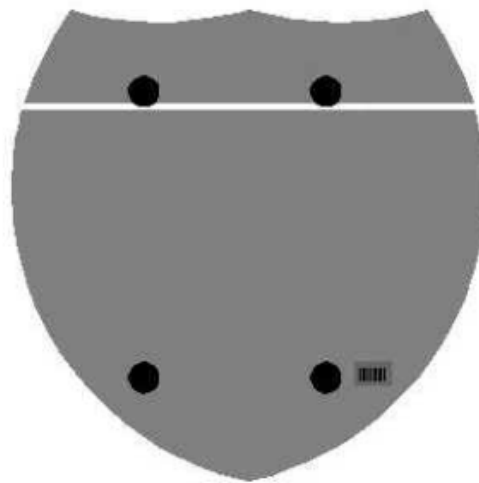
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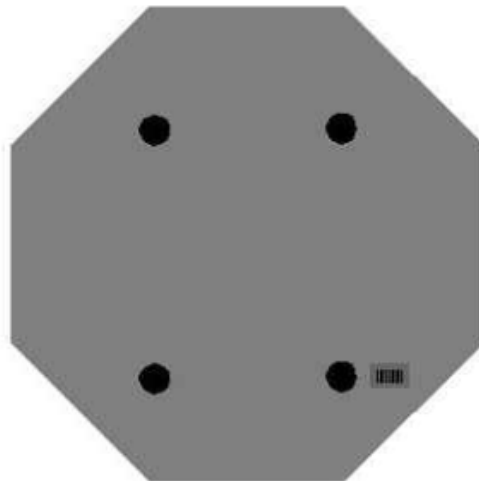
### One Sign Post



### Double Sign Post



Interstate  
Shield

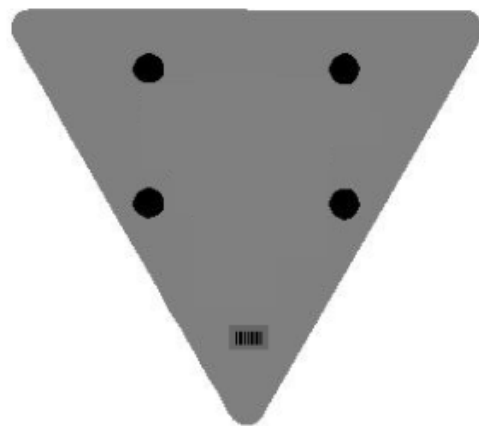


48" Stop

### 2 Post Signs



↑  
2" Wide Post



**SPECIAL NOTE FOR LONGITUDINAL PAVEMENT JOINT ADHESIVE**

1. DESCRIPTION. This specification covers the requirements and practices for applying an asphalt adhesive material to the longitudinal joint of the surface course of an asphalt pavement. Apply the adhesive to the face of longitudinal joint between driving lanes for the first lane paved. Then, place and compact the adjacent lane against the treated face to produce a strong, durable, waterproof longitudinal joint.
2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Joint Adhesive. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide an adhesive conforming to the following requirements:

Property	Specification	Test Procedure
Viscosity, 400 ° F (Pa·s)	4.0 – 10.0	ASTM D 4402
Cone Penetration, 77 ° F	60 – 100	ASTM D 5329
Flow, 140 ° F (mm)	5.0 max.	ASTM D 5329
Resilience, 77 ° F (%)	30 min.	ASTM D 5329
Ductility, 77 ° F (cm)	30.0 min.	ASTM D 113
Ductility, 39 ° F (cm)	30.0 min.	ASTM D 113
Tensile Adhesion, 77 ° F (%)	500 min.	ASTM D 5329, Type II
Softening Point, ° F	171 min.	AASHTO T 53
Asphalt Compatibility	Pass	ASTM D 5329

Ensure the temperature of the pavement joint adhesive is between 380 and 410 °F when the material is extruded in a 0.125-inch-thick band over the entire face of the longitudinal joint.

2.2. Equipment.

2.2.1 Melter Kettle. Provide an oil-jacketed, double-boiler, melter kettle equipped with any needed agitation and recirculating systems.

2.2.2 Applicator System. Provide a pressure-feed-wand applicator system with an applicator shoe attached.

2.3 Personnel. Ensure a technical representative from the manufacturer of the pavement joint adhesive is present during the initial construction activities and available upon the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the pavement joint adhesive, ensure the face of the longitudinal joint is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the joint face by the use of compressed air.

Ensure this preparation process occurs shortly before application to prevent the return of debris on the joint face.

3.2 Pavement Joint Adhesive Application. Ensure the ambient temperature is a minimum of 40 ° F during the application of the pavement joint adhesive. Prior to applying the adhesive, demonstrate competence in applying the adhesive according to this note to the satisfaction of the Engineer. Heat the adhesive in the melter kettle to the specified temperature range. Pump the adhesive from the melter kettle through the wand onto the vertical face of the cold joint. Apply the adhesive in a continuous band over the entire face of the longitudinal joint. Do not use excessive material in either thickness or location. Ensure the edge of the extruded adhesive material is flush with the surface of the pavement. Then, place and compact the adjacent lane against the joint face. Remove any excessive material extruded from the joint after compaction (a small line of material may remain).

3.3 Pavement Joint Adhesive Certification. Furnish the joint adhesive's certification to the Engineer stating the material conforms to all requirements herein prior to use.

3.4 Sampling and Testing. The Department will require a random sample of pavement joint adhesive from each manufacturer's lot of material. Extrude two 5 lb. samples of the heated material and forward the sample to the Division of Materials for testing. Reynolds oven bags, turkey size, placed inside small cardboard boxes or cement cylinder molds have been found suitable. Ensure the product temperature is 400°F or below at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of Pavement Joint Adhesive in linear feet. The Department will not measure for payment any extra materials, labor, methods, equipment, or construction techniques used to satisfy the requirements of this note. The Department will not measure for payment any trial applications of Pavement Joint Adhesive, the cleaning of the joint face, or furnishing and placing the adhesive. The Department will consider all such items incidental to the Pavement Joint Adhesive.
5. PAYMENT. The Department will pay for the Pavement Joint Adhesive at the Contract unit bid price and apply an adjustment for each manufacturer's lot of material based on the degree of compliance as defined in the following schedule. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

Pavement Joint Adhesive Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Joint Adhesive Referenced in Subsection 2.1.1						
Viscosity, 400 ° F (Pa•s) ASTM D 3236	4.0-10.0	3.5-10.5	3.0-3.4 10.6-11.0	2.5-2.9 11.1-11.5	2.0-2.4 11.6-12.0	≤1.9 ≥ 12.1
Cone Penetration, 77 ° F ASTM D 5329	60-100	57-103	54-56 104-106	51-53 107-109	48-50 110-112	≤ 47 ≥ 113
Flow, 140 ° F (mm) ASTM D 5329	≤ 5.0	≤ 5.5	5.6-6.0	6.1-6.5	6.6-7.0	≥ 7.1
Resilience, 77 ° F (%) ASTM D 5329	≥ 30	≥ 28	26-27	24-25	22-23	≤ 21
Tensile Adhesion, 77 ° F (%) ASTM D 5329	≥ 500	≥ 490	480-489	470-479	460-469	≤ 459
Softening Point, ° F AASHTO T 53	≥ 171	≥ 169	166-168	163-165	160-162	≤ 159
Ductility, 77 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9
Ductility, 39 ° F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9

Code  
 20071EC

Pay Item  
 Joint Adhesive

Pay Unit  
 Linear Foot

August 19, 2013

## **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
- II. Nondiscrimination of Employees (KRS 344)
- III. Payment of Predetermined Minimum Wages
- IV. Statements and Payrolls

**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 (between forty and seventy); 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 (between forty and seventy). 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, disability or age (between forty and seventy), except that such notice or advertisement may indicate a preference, limitation, or specification based on religion, or national origin when religion, or national origin 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 (between forty and seventy), 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 administering agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

**III. PAYMENT OF PREDETERMINED MINIMUM WAGES**

1. These special provisions are supplemented elsewhere in the contract by special provisions which set forth certain predetermined minimum wage rates. The contractor shall pay not less than those rates.

2. The minimum wage determination schedule shall be posted by the contractor, in a manner prescribed by the Department of Highways, at the site of the work in prominent places where it can be easily seen by the workers.

**IV. STATEMENTS AND PAYROLLS**

1. All contractors and subcontractors affected by the terms of KRS 337.505 to 337.550 shall keep full and accurate payroll records covering all disbursements of wages to their employees to whom they are required to pay not less than the prevailing rate of wages. Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of one (1) year from the date of completion of this contract.

2. The payroll records shall contain the name, address and social security number of each employee, his correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid.

3. The contractor shall make his daily records available at the project site for inspection by the State Department of Highways contracting office or his authorized representative.

Periodic investigations shall be conducted as required to assure compliance with the labor provisions of the contract. Interrogation of employees and officials of the contractor shall be permitted during working hours.

Aggrieved workers, Highway Managers, Assistant District Engineers, Resident Engineers and Project Engineers shall report all complaints and violations to the Division of Contract Procurement.

The contractor shall be notified in writing of apparent violations. The contractor may correct the reported violations and notify the Department of Highways of the action taken or may request an informal hearing. The request for hearing shall be in writing within ten (10) days after receipt of the notice of the reported violation. The contractor may submit

records and information which will aid in determining the true facts relating to the reported violations.

Any person or organization aggrieved by the action taken or the findings established as a result of an informal hearing by the Division of Contract Procurement may request a formal hearing.

4. The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payments, the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

5. No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

6. No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

7. Every employee on the work covered by this contract shall be permitted to lodge, board, and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

8. Every employee on the project covered by this contract shall be an employee of either the prime contractor or an approved subcontractor.

9. No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

10. No individual shall be employed as a laborer or mechanic on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals.

No Covered employee may be employed on the work except in accordance with the classification set forth in the schedule mentioned above; provided, however, that in the event additional classifications are required, application shall be made by the contractor to the Department of Highways and (1) the Department shall request appropriate classifications and rates from the proper agency, or (2) if there is urgent need for additional classification to avoid undue delay in the work, the contractor may employ such workmen at rates deemed comparable to rates established for similar classifications provided he has made written application through the Department of Highways, addressed to the proper agency, for the supplemental rates. The contractor shall retroactively adjust, upon receipt of the supplemental rates schedule, the wages of any employee paid less than the established rate and may adjust the wages of any employee overpaid.

11. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any work-week in which he is employed on such work, to work in excess of eight hours in any calendar day or in excess of forty hours in such work-week unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such work-week. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. This agreement shall be in writing and shall be executed prior to the employee working in excess of eight (8) hours, but not more than ten (10) hours, in any one (1) calendar day.

12. Payments to the contractor may be suspended or withheld due to failure of the contractor to pay any laborer or

mechanic employed or working on the site of the work, all or part of the wages required under the terms of the contract. The Department may suspend or withhold payments only after the contractor has been given written notice of the alleged violation and the contractor has failed to comply with the wage determination of the Department of Highways.

13. Contractors and subcontractors shall comply with the sections of Kentucky Revised Statutes, Chapter 337 relating to contracts for Public Works.

Revised 2-16-95

## 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 (6) provides:

No present or former public servant shall, within six (6) months of 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 the state in matters in which he was directly involved during 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, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved 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.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, 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, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

### **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](mailto:finance.contractcompliance@ky.gov)** or by phone at 502-564-2874.

General Decision Number: KY150101 09/18/2015 KY101

Superseded General Decision Number: KY20140101

State: Kentucky

Construction Type: Highway

Counties: Boone, Campbell, Kenton and Pendleton Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/02/2015
1	01/23/2015
2	05/01/2015
3	06/05/2015
4	06/19/2015
5	09/11/2015
6	09/18/2015

BRKY0002-005 06/01/2014

	Rates	Fringes
BRICKLAYER.....	\$ 26.50	11.17

BROH0001-005 06/01/2008

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 25.75	8.60

CARP0698-001 05/01/2014

BOONE, CAMPBELL, KENTON & PENDLETON COUNTIES:

	Rates	Fringes
Carpenter & Piledrivermen.....	\$ 27.27	14.59

Diver.....\$ 40.58 9.69

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 ELEC0212-007 06/01/2015

	Rates	Fringes
ELECTRICIAN.....	\$ 27.03	17.02

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 ELEC0212-013 12/01/2014

	Rates	Fringes
Sound & Communication Technician.....	\$ 22.75	10.08

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 \* ENGI0018-013 05/01/2015

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 33.34	14.25
GROUP 2.....	\$ 33.22	14.25
GROUP 3.....	\$ 32.18	14.25
GROUP 4.....	\$ 31.00	14.24
GROUP 5.....	\$ 25.54	14.25
GROUP 6.....	\$ 33.59	14.25
GROUP 7.....	\$ 33.84	14.25

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; & Wheel Excavator

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48"; Bulldozer; Endloader; Hydro Milling Machine; Horizontal Directional Drill (over 500,000 ft.

lbs. thrust); Kolman-type Loader (production type-Dirt);  
Lead Greaseman; Lighting & Traffic Signal Installation  
Equipment (includes all groups or classifications);  
Material Transfer Equipment (Shuttle Buggy) Asphalt;  
Pettibone-Rail Equipment; Power Grader; Power Scraper; Push  
Cat; Rotomill (all), Grinders & Planers of All types;  
Trench Machine (24" wide & under); & Vermeer type Concrete  
Saw

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low  
pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid  
Steer Loader with or without Attachments; Highway Drills  
(all types); Locomotive (narrow gauge); Material  
Hoist/Elevator; Mixer, Concrete (more than one bag  
capacity); Mixer, one bag capacity (Side Loader); Power  
Boiler (Over 15 lbs. Pressure) Pump Operator installing &  
operating Well Points; Pump (4" & over discharge); Roller,  
Asphalt; Rotovator (lime soil stabilizer); Switch & Tie  
Tampers (without lifting & aligning device); Utility  
Operator (Small equipment); & Welding Machines

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh  
Installing Machine; Batch Plant; Boring Machine Operator  
(48" or less); Bull Floats; Burlap & Curing Machine;  
Concrete Plant (capacity 4 yd. & under); Concrete Saw  
(Multiple); Conveyor (Highway); Crusher; Deckhand;  
Farm-type Tractor with attachments (highway) except  
Masonry); Finishing Machine; Fireperson, Floating Equipment  
(all types); Fork Lift (highway); Form Trencher; Hydro  
Hammer; Hydro Seeder; Pavement Breaker; Plant Mixer; Post  
Driver; Post Hole Digger (Power Auger); Power Brush Burner;  
Power Form Handling Equipment; Road Widening Trencher;  
Roller (Brick, Grade & Macadam); Self-Propelled Power  
Spreader; Self-Propelled Power Subgrader; Steam Fireperson;  
Tractor (Pulling Sheepfoot, Roller or Grader); & Vibratory  
Compactor with Integral Power

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum  
Fireperson (Asphalt); Generator; Masonry Fork Lift;  
Inboard-Outboard Motor Boat Launch; Masonry Fork Lift; Oil  
Heater (asphalt plant); Oiler; Power Driven Heater; Power  
Sweeper & Scrubber; Pump (under 4" discharge);  
Signalperson; Tire Repairperson; & VAC/ALLS

GROUP 6 - Master Mechanic & Boom from 150 to 180

GROUP 7 - Boom from 180 and over

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IRON0044-008 06/01/2015

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 23.76	19.15
Structural.....	\$ 26.40	19.15

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IRON0372-004 06/15/2015

Rates                      Fringes

IRONWORKER, REINFORCING.....\$ 27.00 19.00

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 LABO0189-004 07/01/2014

PENDLETON COUNTY:

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 21.80	11.96
GROUP 2.....	\$ 22.05	11.96
GROUP 3.....	\$ 22.10	11.96
GROUP 4.....	\$ 22.70	11.96

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushhammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Driller (All Types); Powderman & Blaster; Troxler & Concrete Tester if Laborer is Utilized

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 LABO0265-009 05/01/2015

BOONE, CAMPBELL & KENTON COUNTIES:

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 28.72	9.85
GROUP 2.....	\$ 28.89	9.85
GROUP 3.....	\$ 29.22	9.85
GROUP 4.....	\$ 29.67	9.85

LABORER CLASSIFICATIONS

GROUP 1 - Asphalt Laborer; Carpenter Tender; Concrete Curing Applicator; Dump Man (Batch Truck); Guardrail and Fence Installer; Joint Setter; Laborer (Construction); Landscape Laborer; Highway Lighting Worker; Signalization Worker; Mesh Handlers & Placer; Right-of-way Laborer; Riprap Laborer & Grouter; Scaffold Erector; Seal Coating; Surface Treatment or Road Mix Laborer; Sign Installer; Slurry Seal; Utility Man; Bridge Man; Handyman; Waterproofing Laborer; Flagperson; Hazardous Waste (level D); Diver Tender; Zone Person & Traffic Control

GROUP 2 - Skid Steer; Asphalt Raker; Concrete Puddler; Kettle Man (Pipeline); Machine Driven Tools (Gas, Electric, Air); Mason Tender; Brick Paver; Mortar Mixer; Power Buggy or Power Wheelbarrow; Sheeting & Shoring Man; Surface Grinder Man; Plastic Fusing Machine Operator; Pug Mill Operator; & Vacuum Devices (wet or dry); Rodding Machine Operator; Diver; Screwman or Paver; Screed Person; Water Blast, Hand Held Wand; Pumps 4" & Under (Gas, Air or Electric) & Hazardous Waste (level C); Air Track and Wagon Drill; Bottom Person; Cofferdam (below 25 ft. deep); Concrete Saw Person; Cutting with Burning Torch; Form Setter; Hand Spiker (Railroad); Pipelayer; Tunnel Laborer (without air) & Caisson; Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning); Sandblaster Nozzle Person; & Hazardous Waste (level B)

GROUP 3 - Blaster; Mucker; Powder Person; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarner; Hazardous Waste (level A); Concrete Specialist; Concrete Crew in Tunnels (With Air-pressurized - \$1.00 premium); Curb Setter & Cutter; Grade Checker; Utility Pipeline Tapper; Waterline; and Caulker

GROUP 4 - Miner; & Gunite Nozzle Person

TUNNEL LABORER WITH AIR-PRESSURIZED ADD \$1.00 TO BASE RATE

SIGNAL PERSON WILL RECEIVE THE RATE EQUAL TO THE RATE PAID THE LABORER CLASSIFICATION FOR WHICH HE OR SHE IS SIGNALING.

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 PAIN0012-016 05/01/2015

	Rates	Fringes
PAINTER		
Bridge.....	\$ 24.39	9.06
Bridge Equipment Tender		

and Containment Builder.....	\$ 20.73	9.06
Brush & Roller.....	\$ 23.39	9.06
Sandblasting & Water Blasting.....	\$ 24.14	9.06
Spray.....	\$ 23.89	9.06

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PLUM0392-008 06/01/2014

	Rates	Fringes
PLUMBER.....	\$ 29.80	17.79

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SUKY2010-161 02/05/1996

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 15.85	4.60
GROUP 2.....	\$ 16.29	4.60

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Driver

GROUP 2 - Euclid Wagon; End Dump; Lowboy; Heavy Duty  
Equipment; Tractor-Trailer Combination; & Drag

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WELDERS - Receive rate prescribed for craft performing  
operation to which welding is incidental.

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Unlisted classifications needed for work not included within  
the scope of the classifications listed may be added after  
award only as provided in the labor standards contract clauses  
(29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification  
and wage rates that have been found to be prevailing for the  
cited type(s) of construction in the area covered by the wage  
determination. The classifications are listed in alphabetical  
order of "identifiers" that indicate whether the particular  
rate is a union rate (current union negotiated rate for local),  
a survey rate (weighted average rate) or a union average rate  
(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed  
in dotted lines beginning with characters other than "SU" or  
"UAVG" denotes that the union classification and rate were  
prevailing for that classification in the survey. Example:  
PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of

the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

\* an existing published wage determination

- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

These rates are listed pursuant to the Kentucky Determination No. CR-15-IV-HWY dated July 20, 2015.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

**TO: EMPLOYERS/EMPLOYEES**

**PREVAILING WAGE SCHEDULE:**

**The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.**

**OVERTIME:**

**Overtime is to be paid after an employee works eight (8) hours a day or forty (40) hours a week, whichever gives the employee the greater wages. At least time and one-half the base rate is required for all overtime. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. Wage violations or questions should be directed to the designated Engineer or the undersigned.**

Director  
Division of Construction Procurement  
Frankfort, Kentucky 40622  
502-564-3500

**PART IV**  
**INSURANCE**

## INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

- 1) Commercial General Liability-Occurrence form – not less than \$2,000,000 General aggregate, \$2,000,000 Products & Completed Aggregate, \$1,000,000 Personal & Advertising, \$1,000,000 each occurrence.
- 2) Automobile Liability- \$1,000,000 per accident
- 3) Employers Liability:
  - a) \$100,000 Each Accident Bodily Injury
  - b) \$500,000 Policy limit Bodily Injury by Disease
  - c) \$100,000 Each Employee Bodily Injury by Disease
- 4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
  - a) "policy contains no deductible clauses."
  - b) "policy contains \_\_\_\_\_ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."
- 5) **KENTUCKY WORKMEN'S COMPENSATION INSURANCE.** The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

**PART V**  
**BID ITEMS**

**PROPOSAL BID ITEMS**

151066

Page 1 of 6

Report Date 9/30/15

**Section: 0001 - PAVING-ASPH ALT**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	13,674.00	TON		\$	
0020	00078		CRUSHED AGGREGATE SIZE NO 2	10,982.00	TON		\$	
0030	00214		CL3 ASPH BASE 1.00D PG64-22	8,894.00	TON		\$	
0040	00388		CL3 ASPH SURF 0.38B PG64-22	1,180.00	TON		\$	
0050	02069		JPC PAVEMENT-10 IN	12,148.00	SQYD		\$	
0060	02101		CEM CONC ENT PAVEMENT-8 IN	47.00	SQYD		\$	
0070	02220		FLOWABLE FILL	7.00	CUYD		\$	
0080	02599		FABRIC-GEOTEXTILE TYPE IV	32,812.00	SQYD		\$	
0090	02677		ASPHALT PAVE MILLING & TEXTURING	55.00	TON		\$	
0100	10203ND		PAVEMENT ADJUSTMENT ASPHALT	1.00	LS	\$85,112.00	\$	\$85,112.00
0110	20550ND		SAWCUT PAVEMENT	273.00	LF		\$	
0120	40074		ASPHALT LEVELING AND WEDGING	47.00	TON		\$	

**Section: 0002 - PAVING-CONC ALT**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0420	00003		CRUSHED STONE BASE	15,250.00	TON		\$	
0430	00078		CRUSHED AGGREGATE SIZE NO 2	2,401.00	TON		\$	
0440	00214		CL3 ASPH BASE 1.00D PG64-22	3,128.00	TON		\$	
0450	00388		CL3 ASPH SURF 0.38B PG64-22	532.00	TON		\$	
0460	02069		JPC PAVEMENT-10 IN	21,546.00	SQYD		\$	
0470	02101		CEM CONC ENT PAVEMENT-8 IN	47.00	SQYD		\$	
0480	02220		FLOWABLE FILL	7.00	CUYD		\$	
0490	02599		FABRIC-GEOTEXTILE TYPE IV	32,739.00	SQYD		\$	
0500	02677		ASPHALT PAVE MILLING & TEXTURING	40.00	TON		\$	
0510	10203ND		PAVEMENT ADJUSTMENT CONCRETE	1.00	LS	\$55,307.00	\$	\$55,307.00
0520	20550ND		SAWCUT PAVEMENT	273.00	LF		\$	
0530	40074		ASPHALT LEVELING AND WEDGING	272.00	TON		\$	

**Section: 0003 - ROADWAY**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0540	01000		PERFORATED PIPE-4 IN	9,989.00	LF		\$	
0550	01810		STANDARD CURB AND GUTTER	9,473.00	LF		\$	
0560	01811		STANDARD CURB AND GUTTER MOD SPECIAL	826.00	LF		\$	
0570	01811		STANDARD CURB AND GUTTER MOD	2,527.00	LF		\$	
0580	01830		STANDARD INTEGRAL CURB	3,621.00	LF		\$	
0590	01845		ISLAND INTEGRAL CURB	1,156.00	LF		\$	
0600	01875		STANDARD HEADER CURB	657.00	LF		\$	
0610	01984		DELINEATOR FOR BARRIER - WHITE	10.00	EACH		\$	
0620	02001		CURB TO BARRIER WALL TRANS	2.00	EACH		\$	
0630	02012		BARRICADE-TYPE I	40.00	EACH		\$	
0640	02014		BARRICADE-TYPE III	37.00	EACH		\$	

**PROPOSAL BID ITEMS**

151066

Page 2 of 6

Report Date 9/30/15

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0650	02091		REMOVE PAVEMENT	5,168.00	SQYD		\$	
0660	02159		TEMP DITCH	1,819.00	LF		\$	
0670	02160		CLEAN TEMP DITCH	909.00	LF		\$	
0680	02200		ROADWAY EXCAVATION	13,703.00	CUYD		\$	
0690	02242		WATER	900.00	MGAL		\$	
0700	02429		RIGHT-OF-WAY MONUMENT TYPE 1	49.00	EACH		\$	
0710	02545		CLEARING AND GRUBBING ACRES	1.00	LS		\$	
0720	02555		CONCRETE-CLASS B	58.00	CUYD		\$	
0730	02562		TEMPORARY SIGNS	1,044.00	SQFT		\$	
0740	02585		EDGE KEY	410.00	LF		\$	
0750	02613		HANDRAIL-TYPE A-3	220.00	LF		\$	
0760	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0770	02671		PORTABLE CHANGEABLE MESSAGE SIGN	6.00	EACH		\$	
0780	02690		SAFELADING	8.00	CUYD		\$	
0790	02701		TEMP SILT FENCE	1,819.00	LF		\$	
0800	02703		SILT TRAP TYPE A	17.00	EACH		\$	
0810	02704		SILT TRAP TYPE B	17.00	EACH		\$	
0820	02705		SILT TRAP TYPE C	17.00	EACH		\$	
0830	02706		CLEAN SILT TRAP TYPE A	17.00	EACH		\$	
0840	02707		CLEAN SILT TRAP TYPE B	17.00	EACH		\$	
0850	02708		CLEAN SILT TRAP TYPE C	17.00	EACH		\$	
0860	02720		SIDEWALK-4 IN CONCRETE	7,682.00	SQYD		\$	
0870	02726		STAKING	1.00	LS		\$	
0880	02775		ARROW PANEL	1.00	EACH		\$	
0890	03149		CONC MEDIAN BARRIER TYPE 9A2	341.00	LF		\$	
0900	04950		REMOVE SIGNAL EQUIPMENT	2.00	EACH		\$	
0910	05950		EROSION CONTROL BLANKET	1,146.00	SQYD		\$	
0920	05952		TEMP MULCH	54,950.00	SQYD		\$	
0930	05953		TEMP SEEDING AND PROTECTION	41,213.00	SQYD		\$	
0940	05963		INITIAL FERTILIZER	2.00	TON		\$	
0950	05964		20-10-10 FERTILIZER	3.00	TON		\$	
0960	05985		SEEDING AND PROTECTION	39,911.00	SQYD		\$	
0970	05990		SODDING	9,873.00	SQYD		\$	
0980	05992		AGRICULTURAL LIMESTONE	32.00	TON		\$	
0990	06510		PAVE STRIPING-TEMP PAINT-4 IN	29,803.00	LF		\$	
1000	06514		PAVE STRIPING-PERM PAINT-4 IN	23,424.00	LF		\$	
1010	06516		PAVE STRIPING-PERM PAINT-8 IN	3,566.00	LF		\$	
1020	06568		PAVE MARKING-THERMO STOP BAR-24IN	1,026.00	LF		\$	
1030	06570		PAVE MARKING-PAINT CROSS-HATCH	16,963.00	SQFT		\$	
1040	06572		PAVE MARKING-DOTTED LANE EXTEN	301.00	LF		\$	
1050	06573		PAVE MARKING-THERMO STR ARROW	6.00	EACH		\$	
1060	06574		PAVE MARKING-THERMO CURV ARROW	24.00	EACH		\$	
1070	06575		PAVE MARKING-THERMO COMB ARROW	23.00	EACH		\$	
1080	08001		STRUCTURE EXCAVATION-COMMON	61.00	CUYD		\$	
1090	20100ES842		PAVE MARK TEMP PAINT LINE ARROW	30.00	EACH		\$	
1100	20782NS714		PAVE MARKING THERMO-BIKE	3.00	EACH		\$	
1110	22520EN		PAVE MARKING-THERMO YIELD BAR-36 IN	81.00	LF		\$	
1120	23158ES505		DETECTABLE WARNINGS	1,129.00	SQFT		\$	
1130	23379EC		STAMPED CONCRETE	776.00	SQYD		\$	
1140	23791EC		PAVE STRIPING-CHEVRON MARKINGS	1,118.00	SQFT		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1150	24386EC		PAVE MARKING THERMO-BIKE LANE ARROW	9.00	EACH		\$	
1160	24722EC		UTILITY RELOCATION & COORDINATION	1.00	LS		\$	

**Section: 0004 - DRAINAGE**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1170	00521		STORM SEWER PIPE-15 IN	1,249.00	LF		\$	
1180	00522		STORM SEWER PIPE-18 IN	1,324.00	LF		\$	
1190	00524		STORM SEWER PIPE-24 IN	448.00	LF		\$	
1200	00526		STORM SEWER PIPE-30 IN	24.00	LF		\$	
1210	00528		STORM SEWER PIPE-36 IN	520.00	LF		\$	
1220	00529		STORM SEWER PIPE-42 IN	770.00	LF		\$	
1230	00530		STORM SEWER PIPE-48 IN	554.00	LF		\$	
1240	00532		STORM SEWER PIPE-60 IN	129.00	LF		\$	
1250	00533		STORM SEWER PIPE-66 IN	815.00	LF		\$	
1260	00980		SLOTTED DRAIN PIPE-12 IN	24.00	LF		\$	
1270	01456		CURB BOX INLET TYPE A	29.00	EACH		\$	
1280	01480		CURB BOX INLET TYPE B	4.00	EACH		\$	
1290	01496		DROP BOX INLET TYPE 3	1.00	EACH		\$	
1300	01538		DROP BOX INLET TYPE 7	3.00	EACH		\$	
1310	01544		DROP BOX INLET TYPE 11	6.00	EACH		\$	
1320	01568		DROP BOX INLET TYPE 13S	28.00	EACH		\$	
1330	01581		DROP BOX INLET TYPE 16G	1.00	EACH		\$	
1340	01720		RECONSTRUCT INLET	2.00	EACH		\$	
1350	01756		MANHOLE TYPE A	2.00	EACH		\$	
1360	01767		MANHOLE TYPE C	2.00	EACH		\$	
1370	01768		MANHOLE TYPE C MOD	4.00	EACH		\$	
1380	01791		ADJUST MANHOLE FRAME TO GRADE	2.00	EACH		\$	
1390	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	12,181.00	SQYD	\$2.00	\$	\$24,362.00
1400	08100		CONCRETE-CLASS A	169.00	CUYD		\$	
1410	08150		STEEL REINFORCEMENT	34,109.00	LB		\$	
1420	20424EC		CONNECT TO EXIST MANHOLE	4.00	EACH		\$	
1430	23795EC		CONNECT STORM LATERAL TO STORM SEWER	2.00	EACH		\$	
1440	23952EC		DRAINAGE JUNCTION BOX TY B	1.00	EACH		\$	
1450	24814EC		PIPELINE INSPECTION	2,842.00	LF		\$	

**Section: 0005 - UTILITY-ELECTRICAL**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1460	08100		CONCRETE-CLASS A	22.00	CUYD		\$	
1470	17000		EC COMMUNICATIONS MANHOLE	4.00	EACH		\$	
1480	17001		EC COMMUNICATIONS PULL BOX	7.00	EACH		\$	
1490	17003		EC DUCT - 02 BANK	208.00	LF		\$	
1500	17004		EC DUCT - 02 BANK CONCRETE ENCASED	456.00	LF		\$	
1510	17005		EC DUCT - 03 BANK	1,128.00	LF		\$	
1520	17006		EC DUCT - 03 BANK CONCRETE ENCASED	1,045.00	LF		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1530	17007		EC DUCT - 04 BANK	138.00	LF		\$	
1540	17008		EC DUCT - 04 BANK CONCRETE ENCASED	232.00	LF		\$	

**Section: 0006 - SEWER**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1550	02690		SAFELOADING	172.00	CUYD		\$	
1560	15003		S CIPP LINER 08 INCH	227.00	LF		\$	
1570	15004		S CIPP LINER 10 INCH	274.00	LF		\$	
1580	15005		S CIPP LINER 12 INCH	291.00	LF		\$	
1590	15007		S CIPP LINER 24 INCH	251.00	LF		\$	
1600	15008		S CIPP LINER SPECIAL 15 INCH	183.00	LF		\$	
1610	15008		S CIPP LINER SPECIAL 18 INCH	761.00	LF		\$	
1620	15008		S CIPP LINER SPECIAL 30 INCH	267.00	LF		\$	
1630	15008		S CIPP LINER SPECIAL 36 INCH	272.00	LF		\$	
1640	15008		S CIPP LINER SPECIAL 42 INCH	289.00	LF		\$	
1650	15092		S MANHOLE	1.00	EACH		\$	
1660	15093		S MANHOLE ABANDON/REMOVE	22.00	EACH		\$	
1670	15094		S MANHOLE ADJUST TO GRADE DETAIL A	13.00	EACH		\$	
1680	15094		S MANHOLE ADJUST TO GRADE DETAIL B	6.00	EACH		\$	
1690	15097		S MANHOLE RECONSTRUCT INVERT	1.00	EACH		\$	
1700	15102		S MANHOLE WITH LINING	14.00	EACH		\$	
1710	15105		S PIPE DUCTILE IRON 10 INCH	144.00	LF		\$	
1720	15111		S PIPE POINT REPAIR	10.00	EACH		\$	

**Section: 0007 - SIGNING**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1730	06405		SBM ALUMINUM PANEL SIGNS	148.00	SQFT		\$	
1740	06406		SBM ALUM SHEET SIGNS .080 IN	725.00	SQFT		\$	
1750	06410		STEEL POST TYPE 1	1,712.00	LF		\$	
1760	06440		GMSS GALV STEEL TYPE B	1,038.00	LB		\$	
1770	06490		CLASS A CONCRETE FOR SIGNS	5.00	CUYD		\$	
1780	24631EC		BARCODE SIGN INVENTORY	185.00	EACH		\$	

**Section: 0008 - SIGNALIZATION**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1790	04795		CONDUIT-2 IN	525.00	LF		\$	
1800	04797		CONDUIT-3 IN	15.00	LF		\$	
1810	04811		ELECTRICAL JUNCTION BOX TYPE B	4.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1820	04821		OPEN CUT ROADWAY	235.00	LF		\$	
1830	04844		CABLE-NO. 14/5C	2,900.00	LF		\$	
1840	04881		MAST ARM POLE	3.00	EACH		\$	
1850	04885		MESSENGER-10800 LB	275.00	LF		\$	
1860	04931		INSTALL CONTROLLER TYPE 170	2.00	EACH		\$	
1870	04932		INSTALL STEEL STRAIN POLE	4.00	EACH		\$	
1880	04935		TEMP SIGNAL	1.00	LS		\$	
1890	04950		REMOVE SIGNAL EQUIPMENT	2.00	EACH		\$	
1900	20093NS835		INSTALL PEDESTRIAN HEAD-LED	16.00	EACH		\$	
1910	20188NS835		INSTALL LED SIGNAL-3 SECTION	11.00	EACH		\$	
1920	23052NN		SPAN MOUNTED SIGN	9.00	EACH		\$	
1930	23157EN		TRAFFIC SIGNAL POLE BASE	24.50	CUYD		\$	
1940	23222EC		INSTALL SIGNAL PEDESTAL	1.00	EACH		\$	
1950	23982EC		INSTALL ANTENNA	2.00	EACH		\$	

**Section: 0009 - LIGHTING**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1960	03381		PVC PIPE-2 IN	5,750.00	LF		\$	
1970	04740		POLE BASE	88.00	EACH		\$	
1980	04741		POLE BASE IN MEDIAN WALL	6.00	EACH		\$	
1990	04761		LIGHTING CONTROL EQUIPMENT	2.00	EACH		\$	
2000	04780		FUSED CONNECTOR KIT	94.00	EACH		\$	
2010	04820		TRENCHING AND BACKFILLING	5,125.00	LF		\$	
2020	04832		WIRE-NO. 12	5,700.00	LF		\$	
2030	04833		WIRE-NO. 8	14,268.00	LF		\$	
2040	04834		WIRE-NO. 6	26,130.00	LF		\$	
2050	04940		REMOVE LIGHTING	1.00	LS		\$	
2060	20391NS835		ELECTRICAL JUNCTION BOX TYPE A	40.00	EACH		\$	
2070	20392NS835		ELECTRICAL JUNCTION BOX TYPE C	3.00	EACH		\$	
2080	20394ES835		PVC CONDUIT-3 IN- IN MEDIAN BARRIER WALL	195.00	LF		\$	
2090	20410ED		MAINTAIN LIGHTING	1.00	LS		\$	
2100	21543EN		BORE AND JACK CONDUIT	2,533.00	LF		\$	
2110	24589ED		LED LUMINAIRE	94.00	EACH		\$	
2120	24831EC		DECORATIVE LIGHT POLE 16 FT	94.00	EACH		\$	

**Section: 0010 - WATERLINE**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0130	14000		W AIR RELEASE VALVE 1 INCH	2.00	EACH		\$	
0140	14003		W CAP EXISTING MAIN	2.00	EACH		\$	
0150	14019		W FIRE HYDRANT ASSEMBLY	11.00	EACH		\$	
0160	14021		W FIRE HYDRANT REMOVE	6.00	EACH		\$	
0170	14023		W FLUSHING ASSEMBLY	1.00	EACH		\$	
0180	14027		W METER 2 INCH	2.00	EACH		\$	
0190	14037		W PIPE DUCTILE IRON 08 INCH	848.00	LF		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0200	14038		W PIPE DUCTILE IRON 10 INCH	7.00	LF		\$	
0210	14039		W PIPE DUCTILE IRON 12 INCH	2,448.00	LF		\$	
0220	14040		W PIPE DUCTILE IRON 16 INCH	172.00	LF		\$	
0230	14048		W PIPE DCTL IRON RSTRND JOINT 08 IN	50.00	LF		\$	
0240	14050		W PIPE DCTL IRON RSTRND JOINT 12 IN	295.00	LF		\$	
0250	14051		W PIPE DCTL IRON RSTRND JOINT 16 IN	110.00	LF		\$	
0260	14080		W SERV PE/PLST LONG SIDE 3/4 IN COPPER	1.00	EACH		\$	
0270	14082		W SERV PE/PLST SHORT SIDE 1 IN COPPER	3.00	EACH		\$	
0280	14084		W SERV PE/PLST SHORT SIDE 2 IN COPPER	1.00	EACH		\$	
0290	14085		W SERV PE/PLST SHORT SIDE 3/4 IN COPPER	1.00	EACH		\$	
0300	14094		W TIE-IN 06 INCH	3.00	EACH		\$	
0310	14095		W TIE-IN 08 INCH	3.00	EACH		\$	
0320	14096		W TIE-IN 10 INCH	1.00	EACH		\$	
0330	14097		W TIE-IN 12 INCH	2.00	EACH		\$	
0340	14098		W TIE-IN 16 INCH	2.00	EACH		\$	
0350	14101		W TIE-IN SPECIAL 10 IN X 10 IN CUT-IN TEE	1.00	EACH		\$	
0360	14105		W VALVE 06 INCH	1.00	EACH		\$	
0370	14106		W VALVE 08 INCH	9.00	EACH		\$	
0380	14108		W VALVE 12 INCH	21.00	EACH		\$	
0390	14109		W VALVE 16 INCH	3.00	EACH		\$	

**Section: 0011 - DEMOBILIZATION &/OR MOBILIZATION**

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0400	02568		MOBILIZATION	1.00	LS		\$	
0410	02569		DEMOBILIZATION	1.00	LS		\$	