

CALL NO. 300

CONTRACT ID. 161234

CARROLL COUNTY

FED/STATE PROJECT NUMBER FD04 SPP 021 0042 009-014

DESCRIPTION CARROLLTON TO GHENT ROAD (US 42)

WORK TYPE GRADE, DRAIN & SURFACE WITH BRIDGE

PRIMARY COMPLETION DATE 11/17/2017

**LETTING DATE:** <u>May</u> 27,2016

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME May 27,2016. 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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### **SCOPE OF WORK**

### **ADMINISTRATIVE DISTRICT - 06**

CONTRACT ID - 161234 FD04 SPP 021 0042 009-014 COUNTY - CARROLL

PCN - DE02100421634 FD04 SPP 021 0042 009-014

CARROLLTON TO GHENT ROAD (US 42) (MP 9.900) WIDEN FOUR MILE ROAD TO WEST GHENT CITY LIMIT (MP 13.200), A DISTANCE OF 03.30 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 06-08002.10.

GEOGRAPHIC COORDINATES LATITUDE 38:43:36.00 LONGITUDE 85:04:46.00

### **COMPLETION DATE(S):**

COMPLETED BY 11/17/2017

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)

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

### **JOINT VENTURE BIDDING**

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

### **UNDERGROUND FACILITY DAMAGE PROTECTION**

The contractor 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 <u>KRS 14A.9-030</u> 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 <u>KRS 14A.9-010</u>, the foreign entity should identify the applicable exception. Foreign entity is defined within <u>KRS 14A.1-070</u>.

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 <a href="https://secure.kentucky.gov/sos/ftbr/welcome.aspx">https://secure.kentucky.gov/sos/ftbr/welcome.aspx</a>.

### 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 <a href="mailtokytc.projectquestions@ky.gov">kytc.projectquestions@ky.gov</a>. 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 (<a href="www.transportation.ky.gov/contract">www.transportation.ky.gov/contract</a>). 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.

02/24/16

### 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.

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### 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.

### ASPHALT PAVEMENT RIDE QUALITY CATEGORY B

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

### FUEL AND ASPHALT PAY ADJUSTMENT

The Department has included the Contract items Asphalt Adjustment and Fuel Adjustment for possible future payments at an established Contract unit price of \$1.00. The Department will calculate actual adjustment quantities after work is completed. If existing Contract amount is insufficient to pay all items on the contract with the adjustments, the Department will establish additional monies with a change order.

### **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.

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Contractor is to salvage and reinstall all traffic control signs within the project limits upon completion of the project. This work will be incidental to Maintain and Control Traffic.

## KENTUCKY TRANSPORTATION CABINET DEPARTMENT OF HIGHWAYS TRAFFIC MANAGEMENT PLAN CARROLL COUNTY, ITEM 6-8002.10 US 42 FROM FOUR MILE ROAD TO WEST GHENT CITY LIMITS

### Public Information Plan (PIP) and Temporary Traffic Control Plan (TTCP)

The following PIP and TTCP will cite the word "Referenced". This infers to this document as well as all bidding documents associated to the respective project, including but not limited to the Construction Plan Set, Capture all Promises – "CAP", KYTC Specifications, KYTC Standard Drawings, KYTC Sepia Drawings, KYTC Policy and Procedures for Safety and Mobility through Work Zones, Manual on Uniform Traffic Control Devices, FHWA's Guidance for Developing and Implementing Traffic Management Plans. (All being of Current Edition)

### 1) Public Information Plan a) Prepared by X KYTC or b) Identify Trip Generators Referenced Trip Generators include local residential and business traffic, school buses, emergency responders c) Identify Types of Road Users Referenced Cars, Trucks, School Buses d) Public Information Message Referenced, See Below e) Public Information Strategies to be used Referenced See Below f) Railroad Involvement Referenced: See Below g) Address Pedestrians, Bikes & Mass Transit Referenced: See TTCP h) Address Timing, Frequency, Updates, Effectiveness Referenced, See TTCP of-Plan

The primary goal of the Public Information Plan (PIP) is to inform the motoring public and area stakeholders of project information including Temporary Traffic Control Plan (TTCP). The KYTC District Six Public Information Officer (PIO) will coordinate and disseminate to stakeholders and the media appropriate information regarding construction plans.

### Local Stakeholders

- Elected Officials
  - State Senator Rick Rand
  - State Representative Paul Hornback
  - County Judge Bobby Lee Westrick
- Local Agencies
  - Carroll County Public Schools
  - Carroll County Police and Fire
- Utility Companies

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## KENTUCKY TRANSPORTATION CABINET DEPARTMENT OF HIGHWAYS TRAFFIC MANAGEMENT PLAN CARROLL COUNTY, ITEM 6-8002.10 US 42 FROM FOUR MILE ROAD TO WEST GHENT CITY LIMITS

 Local utility companies are kept apprised of all new projects by District 6 and are invited to all pre-construction meetings

### **Trucking Firms and Out of State Stakeholders**

Information will be distributed electronically to trucking firms via Director? at the Department of Vehicle Registration (502-564-4540, *provide email*)? Information will also be posted on the 511 website (<a href="https://www.511.ky.gov">www.511.ky.gov</a>) and on the 511 telephone information system.

### Presentation

A project description including anticipated schedule will be provided to the media, stakeholders and other emergency service agencies via e-mail prior to construction. Information will be provided to these groups via traffic advisories, press releases, and the District 6 website.

### **Media Strategies**

The following media will be contacted at the beginning of the construction project at key construction transitions points during construction and at the end of construction:

### Points of Media Contact

- Newspapers: Carrollton News Democrat, and Madison Currier
- Radio: Cincinnati and Louisville Market
- Television / Cable: Cincinnati and Louisville Market

### Milestones to Contact Media

Media shall be contacted immediately prior to construction and updated throughout construction, and at significant transitions of construction phases.

### Public Information Message

Notifications of the closures and detours will be provided a minimum of one week advance notice. Appropriate time notification will be provided to the *Cincinnati Enquire* with respect to their days of publication. Further, variable message boards will be used throughout the community for notice.

### KENTUCKY TRANSPORTATION CABINET DEPARTMENT OF HIGHWAYS TRAFFIC MANAGEMENT PLAN CARROLL COUNTY, ITEM 6-8002.10 US 42 FROM FOUR MILE ROAD TO WEST GHENT CITY LIMITS

### 2) Temporary Traffic Control Plan (TTCP)

### Phase 1

### **Description of Phase Activities**

- Construct the west side of the proposed McCools Creek Bridge
- 2. Construct pavement wedging operation
- 3 Construct new westbound pavement

### Lane Use on Maintained Roads

Two-way traffic on US 42

### **Key Access Points**

Business Access Access to all entrances and driveways to be maintained

a) Is Road Closure Allowed?

b) Detour Conditions

c) Working Hour Restrictions

d) Holiday or Special Event Work Restrictions

N/A

e) Evaluation of Intersection LOS

N/A – Deleted thru remainder of Phases

N/A – Deleted thru remainder of Phases

g) Evaluation of User Costs & Incentives / N/A

Disincentives

h) Method of Project Bidding
i) Address Drop-Off Protection Criteria
j) Temporary Barrier Requirements
k) Evaluation of Existing Guardrail Conditions
N/A.

Construction
Referenced
Referenced;

1) Address Temporary Drainage Referenced; Contractor to follow BMPs

m) Special Notes N/A
n) Address Pedestrians, Bikes & Mass Transit N/A

### Phase 2

### **Description of Phase Activities**

- Construct the east side of the proposed McCools Creek Bridge
- 2 Construct pavement wedging operation
- Construct new eastbound pavement

### Lane Use on Maintained Roads

Traffic moved to new westbound lanes.

## KENTUCKY TRANSPORTATION CABINET DEPARTMENT OF HIGHWAYS TRAFFIC MANAGEMENT PLAN CARROLL COUNTY, ITEM 6-8002.10 US 42 FROM FOUR MILE ROAD TO WEST GHENT CITY LIMITS

### Key Access Points to Maintain

a)	Is Road Closure Allowed?	No
b)	Detour Conditions	N/A
c)	Working Hour Restrictions	No
d)	Holiday or Special Event Work Restrictions	No
	Fredricking States of the state of	-

g) Evaluation of User Costs & Incentives / Referenced

**Disincentives** 

h) Method of Project Bidding
i) Address Drop-Off Protection Criteria
j) Temporary Barrier Requirements
k) Evaluation of Existing Guardrail Conditions
Referenced
Referenced
Referenced

I) Address Temporary Drainage Referenced; Contractor to follow BMPs

m) Special Notes Referenced in Plan Set.

n) Address Pedestrians, Bikes & Mass Transit Referenced:

### Phase 3

### **Description of Phase Activities**

1. Final surface installation and final striping

### Lane Use on Maintained Roads

Traffic in final configuration

### Key Access Points to Maintain

a) Is Road Closure Allowed?
b) Detour Conditions
c) Working Hour Restrictions
d) Holiday or Special Event Work Restrictions

g) Evaluation of User Costs & Incentives / Referenced

Disincentives

h) Method of Project Bidding Referenced
i) Address Drop-Off Protection Criteria Referenced
j) Temporary Barrier Requirements Referenced
k) Evaluation of Existing Guardrail Conditions Referenced

I) Address Temporary Drainage Referenced; Contractor to follow BMPs

m) Special Notes Referenced in Plan Set.

n) Address Pedestrians, Bikes & Mass Transit Referenced:

### Special Note for Bridge Demolition, Renovation and Asbestos Abatement

If the project includes any bridge demolition or renovation, the successful bidder is required to notify Kentucky Division for Air Quality (KDAQ) via filing of form (DEP 7036) a minimum of 10 days prior to commencement of any bridge demolition or renovation work.

Any available information regarding possible asbestos containing materials (ACM) on or within bridges to be affected by the project has been included in the bid documents. These are to be included with the Contractor's notification filed with the KDAQ. If not included in the bid documents, the Department will provide that information to the successful bidder for inclusion in the KDAQ notice as soon as possible. If there are no documents stating otherwise, the bidders should assume there are no asbestos containing materials that will in any way affect the work.



Matthew G. Bevin Governor

**Greg Thomas**Secretary

### Memorandum

To:

Robert Hoagland

CC:

From: O'Dail Lawson

Environmental Scientist V

Division of Environmental Analysis

**Date:** 4/29/2016

**Re:** Asbestos Inspection Report for Carroll 06-8002.10

This report is prepared to accompany the 10-Day NOI for Demolition to the Division of Air Quality. Please include all pages with submittal.

### **Project and Structure Information**

Project # Carroll 06-8002.10

Bridge # 021B00048N

Location: US-42 over McCool Creek

<u>Description:</u> The samples collected were negative for asbestos. No abatement necessary.

Inspection Date: April 27, 2016

### **Results**

The results revealed that there is no ACM abatement required at this time.



Analysis N#

Client Name:

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MRS, Inc. Analytical Laboratory Division

Address: Item # 06-8002.10

**Carroll County** 

332 West Broadway, Suite 613 Louisville, Kentucky 40202

24284

**KYTC** 

(502) 495-1212 Fax: (502) 491-7111

### **BULK SAMPLE ASBESTOS ANALYSIS**

Sampled By:		O'Dail Lawson									
		% FIBROUS ASBESTOS			% NON-ASBESTOS FIBERS						
Number	Color	Layered	Fibrous	Chrysotile	Amosite	crocidolite	Others	Cellulose	Fiberglass		Other/Mat.
# C 1	Black	Yes	No				None				100%
	<u>                                     </u>					<u> </u>					
								П			
			1								
					35						

Methodology: EPA Method 600/R-93-116

Date Analyzed: 28-Apr-16

Analyst : Winterford Mensah

Reviewed By:

Historia Merral

The test relates only to the items tested. This report does not represent endorsement by NVLAP or any agency of the U.S Government. Partial Reproduction of any part of this report is strictly prohibited. Samples shall be retained for (30) days.

AJHA # 102459 AJHA #1 02459

## Chain of Custody Record

Kentucky Transportation Cabinet 200 Mcro Street, 5th Floor West Frankfort, Kentucky 40622 (502) 564-7250 fax (502) 564-5655

TRANSPORTATION CABINET

Preservative Page 1 01.6008-90 N/A Type Cont. Contr comp CARROLL Coat of Course 6/87 Black Weil ague Samplers (signature): Analysis Requested Client Information KY TRANS CABINET KYTC COC FTD = Filter Tampering or Damaged Fax: 502-564-5655 N/A = Not Applicable Date/Time: ND = None Detected Date/Time: Date/Time: Date/Time: 8009,10 12:55 Collected Results Code: 4/27/16 Date ٥, O'Dail Lawson o'dail lawson@ky.gov ( ARROLL COM DOUND Sample ID Sample Description Project or Subject Reference 200 Mero Street 502-564-7250 Lint Frankfort Received at Lab By: KYTC Relinquished By: Received By: -Relinquished By: Phone: PO#:

# ENVIRONMENTAL TRAINING CONCEPTS, INC

P.O Box 99603 Louisville, KY 40269 (502)640-2951

Certification Number: ETC-AIR-071415-00276

## O'Dail Lawson

has on 07-14-2015, attended and successfully completed the requirements and passed the examination with a score of 70% of better on the entitled course.

## **ASBESTOS INSPECTOR REFRESHER**

SOP

Training was in accordance with 40 CFR Part 763 (AHERA) approved by the Commonwealth of Kentucky, the Indiana Department of Environmental Management and Tennessee Department of Environment & Conservation The above student received requisite training for Asbestos Accreditation under Title II of the Toxic Substance Act (TSCA).

Conducted at: 1220 Kentucky Mills Drive, Louisville, KY

Name - Training Manager

Expiration Date: 07-14-2016

Name - Instructor



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

TC 62 226 Rev 01/2016 Page 1 of 1

### **RIGHT OF WAY CERTIFICATION**

Original Re-Certification	RIGHT OF WAY CERTIFICATION						
	COUNTY PROJECT # (STATE) PROJECT # (FEDERAL)						
06-8002.10 Carroll							
	FD04 1100 021 6898601						
PROJECT DESCRIPTION 1							
WIDEN FOUR MILE ROAD TO WEST GHENT CITY LIMIT (SECTION 4)(2006BOPC)(00CCN)(10CCR)							
No Additional Right of Way Required							
Construction will be within the limits of the existing right of way. The right of way was acquired in accordance to FHWA regulations							
under the uniform relocation Assistance and	Real Property Acquisitions Policy Act of 1970, as amended. No additional right of way or						
	relocation assistance were required for this project.						
<u> </u>	Condition # 1 (Additional Right of Way Required and Cleared)						
possession. Trial or appeal of cases may be no	All necessary right of way, including control of access rights when applicable, have been acquired including legal and physical						
possession. Trial or appeal of cases may be pending in court but legal possession has been obtained. There may be some improvements remaining on the right-of-way, but all occupants have vacated the lands and improvements, and KYTC has physical possession and the							
rights to remove, salvage, or demolish all improvements and enter on all land. Just Compensation has been paid or deposited with the							
court. All relocations have been relocated to decent, safe, and sanitary housing or that KYTC has made available to displaced persons							
adequate replacement housing in accordance with the provisions of the current FHWA directive.							
Condition # 2 (Additional Right of Way Required with Exception)							
The right of way has not been fully acquired,	the right to occupy and to use all rights of way required for the proper execution of the						
right of entry has been acquired. Some parcels may	be pending in court and on other parcels full legal possession has not been obtained, but						
right of entry has been obtained, the occupants of all lands and improvements have vacated, and KYTC has physical possession and right							
Compensation for all pending parcets will be	to remove, salvage, or demolish all improvements. Just Compensation has been paid or deposited with the court for most parcels. Just Compensation for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract						
Condition # 3 (Additional Right of Way Required with Exception)							
The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. All							
remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. KYTC is hereby							
requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary right of way will not							
frequesting authorization to advertise this pro	ject for bids and to proceed with bid letting even though the necessary right of way will not						
requesting authorization to advertise this pro be fully acquired, and/or some occupants will	ject for bids and to proceed with bid letting even though the necessary right of way will not not be relocated, and/or the just compensation will not be paid or deposited with the						
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CARROLL COUNTY
FD04 02168986 01U
US-42 WIDENING FROM FOUR MILE ROAD
TO WEST OF GHENT
ITEM NO. 06-8002.10

### **GENERAL PROJECT NOTE ON UTILITY PROTECTION**

Utility coordination efforts have 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.

### 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.

## CARROLL COUNTY FD04 02168986 01U US-42 WIDENING FROM FOUR MILE ROAD TO WEST OF GHENT ITEM NO. 06-8002.10

### 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 Phasina

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

Carrollton Utilities Gas, Carrollton Utilities Sanitary Force Main, Carroll County Water District, Kentucky Utilities, AT&T Kentucky, Time Warner Cable & Fiber, Windstream Communications, and North American Stainless (NAS) all 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

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

Kentucky Utilities, AT&T Kentucky, Time Warner Cable & Fiber and Windstream Communications all have underground and overhead facilities to relocate. These utilities should complete their relocations by November 1, 2016.

<u>North American Stainless (NAS)</u> has overhead electric facilities to relocate. This work should be completed by November 1, 2016.

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 <u>Carrollton Utilities Gas</u>, <u>Carrollton Utilities Sanitary Force Main</u>, <u>Carroll County Water District</u>, <u>Kentucky Utilities</u>, <u>AT&T Kentucky</u>, <u>Time Warner Cable & Fiber</u>, <u>Windstream Communications</u>, <u>and North American Stainless (NAS)</u>. Working days will not be charged for those days on which work on Carrollton Utilities, Carroll County Water District, Kentucky Utilities, AT&T Kentucky, Time Warner Cable & Fiber,

## CARROLL COUNTY FD04 02168986 01U US-42 WIDENING FROM FOUR MILE ROAD TO WEST OF GHENT ITEM NO. 06-8002.10

Windstream Communications and North American Stainless facilities is delayed, as provided in the current edition of the <u>KY Standard Specifications for Road and Bridge Construction</u>. 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

<u>Carrollton Utilities Gas</u> facilities are to be relocated by the road contractor as shown on the <u>Gas</u> <u>Relocation Plan</u> set included in the roadway plans with specifications in the proposal.

Any gas meters that require replacement and/or relocation will be supplied and installed by Carrollton Utilities.

Carrollton Utilities requires the use of their prequalified contractors. See Utility General Notes for details.

Cathodic Protection on the new gas main will be considered incidental to the gas main construction.

<u>Carrollton Utilities Sanitary Force Main</u> facilities are to be relocated by the road contractor as shown on the <u>Sanitary Sewer Relocation Plan</u> set included in the roadway plans with specifications in the proposal.

<u>Carroll County Water District</u> facilities are to be relocated by the road contractor as shown on the <u>Water Main Relocation Plan</u> set included in the roadway plans with specifications in the proposal.

Carrol County Water District requires the use of their prequalified contractors. See Utility General Notes for details.

North American Stainless (NAS) gas and water facilities are to be relocated by the road contractor as shown on the <u>Relocation Plan for NAS Utilities</u> set included at the end of the Structure Plans # 27336, sheets 29-31.

THE FOLLOWING RAIL	COMPANIES HAVE FACILITIES IN CONJUNCTI	ON WITH THIS PROJECT AS NOTED
■ No Rail Involved	☐ Minimal Rail Involved (See Below)	Rail Involved (See Below)

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### <u>SPECIAL CAUTION NOTE - PROTECTION OF UTILITIES</u>

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.

### **AREA UTILITIES CONTACT LIST**

**Utility Company/Agency** 

**Contact Name** 

Contact Information

AT THE PRECONSTRUCTION MEETING

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

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

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

### **PROTECTION OF EXISTING UTILITIES**

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

### PREQUALIFIED UTILITY CONTRACTORS

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner. Those utility owners with a prequalification or preapproval requirement are as follows:

Carrollton Utilities (Gas Work Only)
Carroll County Water District No. 1

(Note: Carrollton Utilities does not prequalify contractors for sanitary sewer work)
(Note: North American Stainless does not prequalify contractors for water or gas work)

The bidding contractor needs to review the above list and choose from the list of approved subcontractors at the end of these general notes as identified above before bidding. When the list of approved subcontractors is provided, only subcontractors shown on the following list(s) will be allowed to work on that utility as a part of this contract.

When the list of approved subcontractors for the utility work is <u>not</u> provided in these general notes, the utility work must be completed by either the prime contractor or a subcontractor that is prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (133). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

### **CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK**

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

### SUBMITTALS AND CORRESPONDENCE

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

### **ENGINEER**

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

### **INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE**

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

### NOTICE TO UTILITY OWNERS OF THE START OF WORK

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

### **UTILITY SHUTDOWNS**

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

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

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

### CUSTOMER SERVICE AND LATERAL ABANDONMENTS

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

### **STATIONS AND DISTANCES**

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

### **RESTORATION**

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

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

### GAS STANDARD BID ITEM ADDED NOTES TO CONTRACTOR

G PIPE It shall be understood that in addition to the standard bid item description included elsewhere for this item, this standard bid item includes all cathodic protection materials and installation as required by gas technical specifications and plans. No separate payment will be made for required cathodic protection.

G LONG SIDE SERVICE and G SHORT SIDE SERVICE It shall be understood that in addition to the standard bid item descriptions included elsewhere for these service bid items, these standard bid items shall include labor, equipment, and materials to install the associated farm tap at service locations as required by gas technical specifications and plans. No separate payment will be made for farm taps.

G POINT RELOCATE It shall be understood that in addition to the standard bid item description included elsewhere for this item, this standard bid item includes all bypass materials and installation as required by gas technical specifications and plans. No separate payment will be made for bypass.

G TIE-IN It shall be understood that in addition to the standard bid item description included elsewhere for this item, this standard bid item includes all temporary bypass materials and installation as required by utility plans for relocation of facilities owned by North American Stainless at Gate 5 and the new haul road bridge over US-42. No separate payment will be made for bypass.

### GAS GENERAL NOTES TO CONTRACTOR

Gas Meters will be provided and installed by Carrollton Utilities as needed concurrently with road construction. The road contractor and gas subcontractor shall cooperate and coordinate with Carrollton Utilities to accomplish this work.

Radiographic Weld Inspection will be provided by Carrollton Utilities utilizing an outside vendor of their choosing. The road contractor and gas subcontractor shall cooperate and coordinate with Carrollton Utilities to accomplish this work.

### WATER GENERAL NOTES TO CONTRACTOR

The item "W Remove Transite (AC) Pipe" is included in the water bid items in this contract. This bid item is to provide for payment for removal and disposal of transite pipe at incidental locations during road constriction. Payment shall not be made under this item at water main tie-in locations as transite pipe removal and disposal is incidental to the bid item "W Tie-In Special".

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

### MATERIAL

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

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

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

### **SECURITY OF SUPPLIED MATERIALS**

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

### **Pre-qualified Gas Contractors**

Contractors that perform the gas line relocation work contained in this contract and owned by Carrollton Utilities must pre-qualified to bid and perform the work. The following contractors are pre-qualified by Carrollton Utilities:

Jeff Meinders  C&HM Construction Inc. 3687 North County Road 500 East Milan, Ohio 47031 812-564-2030 812-871-1313 Cell	Rick Phillips C. J. Hughes Construction Co., Inc. P. O. Box 7304 Huntington, WV 25776 304-522-3868
Electricom P. O. Box 319 Paoli, IN 47454 812-723-2626  James N. Bush Construction, Inc. 374 Buffalo Valley Road, Suite A Cookeville, TN. 38501 P. O, Box 808 Cookeville, TN. 38503 931-526-3223	The Fishel Company 4508 Bishop Lane Louisville, KY 40218 502-456-2900 Shaun Martin Martin Construction 2371 Irvine Road Richmond, KY 40475 606-305-6434
Southern Pipeline 1272 Old Fern Valley Road Louisville, KY 40219 502-966-5195	Bill Harp Stanley Pipeline 5425 Paris Road Winchester, Kentucky 40391 859-745-2576 859-749-9562 cell

The bidding contractor needs to choose from the above list of approved subcontractors before bidding. Only subcontractors shown above will be allowed to work on the gas relocation work as a part of this contract.

### **Pre-qualified Water Contractors**

Contractors that perform the water line relocation work contained in this contract and owned by Carroll County Water District No. 1 must pre-qualified to bid and perform the work. The following contractors are pre-qualified by Carroll County Water District No. 1:

Jeff Meinders	Barry Stotts		
C&HM Construction Inc. 3687 North County Road 500 East Milan, Ohio 47031 812-564-2030	Stotts Construction Co., Inc. P. O. Box 1689 Columbia, KY 42728 270-384-2677		
812-871-1313 Cell			
Joe Finley	Kenney Inc.		
Twin States Utilities & Excavating	P.O. Box 1305		
P.O. Box 14	Mount Sterling, KY 40353		
Mt. Herman, KY 42157	270-427-5300		
270-427-5300	1_		

The bidding contractor needs to choose from the above list of approved subcontractors before bidding. Only subcontractors shown above will be allowed to work on the water relocation work as a part of this contract.

### SPECIAL UTILITY BID ITEM DESCRIPTIONS

### **Gas Special Bid Item Descriptions**

G VALVE SPECIAL This description shall apply to the 10-inch above grade isolation valve and assembly as specified in the plans and standard details. This item includes all labor, equipment, excavation, fittings, welds, reducers, flanges, gasket and bolts, ball valves, valve supports, concrete foundation and sleepers, for a complete assembly. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid EACH (EA) when complete.

G SERVICE SPECIAL This description includes all labor, equipment, materials and restoration, to install a new gas service regulator assembly as indicated on plans and standard details 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. Paid EACH (EA) when complete.

### **Sewer Special Bid Item Descriptions**

S SPECIAL ITEM This item is to be used for the manhole installation for the 3-Inch FM tie-in to the 6-Inch FM. This item includes all labor, equipment and materials (pipe, air release valve, ball valve and check valve), pre-cast 5-ft diameter manhole and aluminum access hatch, including excavation, backfill, compaction and restoration, as shown on the plans 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. Paid EACH (EA) when complete.

### Water Special Bid Item Descriptions

W ENCASEMENT SPECIAL This item shall include the installation of 12 inch PVC (ASTM 3034/SDR 35 or AWWA C900/SDR26) encasement pipe open cut, size as shown on the project drawings, casing spacers, end seals, labor, and equipment. 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).

W PIPE SPECIAL This description shall include the installation of restrained joint PVC (SDR 17) Certa-Lok Yelomine pipe, or approved equal, as shown on the project drawings. 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 restrained 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. 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 TIE-IN SPECIAL This bid description shall be used for all main tie-ins to asbestos cement (AC) pipe. This item includes all labor, equipment, excavation, fittings, sleeves, reducers, special couplings, removal and disposal of AC pipe, restoration, 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. No separate payment shall be made under the bid item "W Remove Transite (AC) Pipe" at these tie-in locations. 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 SPECIAL This item is for payment for the relocation of all water meters, regardless of size, to the location as shown on the project drawings. This item shall include furnishing and installing a new meter box, casting, meter setter and other associated materials. This item shall also include all labor and equipment required to move the existing meter to the new meter box for a complete installation. Removed existing meter boxes and setters shall become the property of the contractor. 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 SPECIAL This item is for payment for the construction of a new "Post Indicator Valve" owned by North American Stainless at Gate 5 and the new haul road bridge over US-42. The bidding contractors will have to view the existing post indicator valve in the field prior to bidding, and be prepared to construct a new post indicator valve at the location shown on structure plan sheet S30. The new post indicator valve shall be of the same chamber dimensions, piping, fittings, access hatch or casting, and all other associated items and amenities. This item shall include furnishing and installing all new materials, all labor, and equipment to construct a new post indicator valve 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.

### Standard Gas 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 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.

G 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 gas main under streets, creeks, 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. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall be for all sizes and not be size specific. 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. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

**G ELECTRONIC ID MARKER** This bid item is to pay for labor, equipment, computer programing, and installation of an electronic ID marker at the locations shown on the plans or as directed by the engineer. The marker may be in the form of a ball, disk, cylinder, post, or other shape as required by specification and may be buried, at grade, or above grade as specified. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid EACH (EA) when complete.

NOTE: This bid item is not for payment of standard non-electronic markers or monuments. A separate "Line Marker" bid item is established for this purpose.

**G 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, vents, 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.

**G 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, vents, 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.

G FARM TAP AND REGULATOR This item is for the installation of gas service tap and regulator assembly on a gas transmission main. This item shall include excavation, labor, equipment, and all tapping, piping, fittings, and regulator materials to install the farm tap and regulator assembly in accordance with the plans, specifications, and standard drawings complete and ready for use. Only one pay item has been established for Farm Tap and Regulator installations. Payment shall be made under this item regardless of farm tap service and regulator size. No separate pay items will be established for size 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.

**G LINE MARKER** This item is for payment for furnishing and installing a gas 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.

NOTE: This bid item is not for payment of "Electronic ID Markers". Electronic ID Markers are paid under a separate bid item.

**G MAIN ABANDON** This bid item is in full payment for all efforts in abandonment of all gas mains and facilities shown to be abandoned on the plans, for removal of any sections of abandoned main that is in conflict with road construction, and for nitrogen purge and plug of any sections of main that are to remain. All work shall be done in accordance with the plans and specifications, and in accordance with

all pipeline safety regulations. This bid item is for all work to abandon and purge gas main in the total project regardless of size or length. No adjustment in the unit bid price will be allowed if the scope of work described in this item should increase in this contract for any reason. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item is to be paid LUMP SUM (LS) when complete.

G 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 gas main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation. All new materials are to be used. 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. 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. Main Point 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.

G METER AND REGULATOR This bid item description shall be used for all meter and regulator bid items of every size except those defined as "Special". These pay items are for all labor, equipment, and materials needed for the installation of a service meter and regulator assembly at the locations shown on the plans or as directed by the engineer in accordance with specifications and standard drawings complete and ready for use. Materials to be provided under this bid item shall include, but are not limited to, meter, regulator, piping, fittings, building anchoring brackets, and hardware needed to create and install the assembly. 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.

**G PIPE** This description shall apply to all polyethylene/plastic and steel pipe bid items of every size and type to be used as gas 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), corrosion protective coatings of steel pipe and fittings, labor, equipment, excavation, bedding, restoration, pressure testing, 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. For steel pipe, this bid item shall include all cathodic protection anodes, lead wire, test boxes or stations, and any accessories. No additional payment will be made for rock excavation. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Measurement of quantities under this item shall be through valves (including horizontal measurements through above grade valves), 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.

G REGULATOR STATION Includes all labor, equipment, materials and restoration, to install a new gas regulator station as indicated on plans and on standard drawings compete and ready for use. Only one pay item has been established for regulator station installations. Payment shall be made under this item regardless of regulator station size. No separate pay items will be established for size 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.

NOTE: This item is to be used to pay for regulator stations to reduce the pressure of gas from a higher pressure main to feed a lower pressure main. This item is not to be used to pay for regulators used on individual customer service lines.

G 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, 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, 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. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

G 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, coupling for connecting the new piping to the surviving existing piping, 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 installations were both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public

roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. 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.

G SERVICE RELOCATE This item is for the relocation of an existing gas 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.

G TIE-IN This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items of every size except those that include a temporary bypass or are defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, restoration, testing and backfill required to make the gas 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. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. 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.

G TIE-IN W/BYPASS This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items that include temporary bypass of every size except those defined as "Special". This item includes all labor, equipment (including tapping, stopple and/or squeeze equipment), excavation, permanent and temporary fittings (including, but not limited to, tees, split tees, bends, reducers, plugs, caps, and couplings), temporary bypass piping, restoration, testing and backfill required to make the gas main tie-in with temporary bypass as shown on the plans, and in accordance with the specifications complete and ready for use. Mainline pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. 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:* The tie-in size reflected in the bid item reflects the nominal internal diameter size of the main gas line being tied-in, not the bypass pipe size.

**G VALVE** This description shall apply to all buried valves of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be

for gas valves being installed with new main. This item includes the valve as specified in the plans and specifications, protective coating and corrosion protection, labor, equipment, excavation, valve box and valve stem extensions, backfill, 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. 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.

**G VALVE ABOVE GRADE** This description shall apply to all above grade valve assemblies of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for above grade gas valves being installed with new main. This item includes the above grade valve, pipe, and fittings as specified in the plans, specifications and standard drawings. This bid items shall also include protective coating and corrosion protection, labor, equipment, excavation, backfill, restoration, testing, etc., required to install the specified above grade valve at the location shown on the plans 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.

**G 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, 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.

**G WELD X-RAY INSPECTION** This description shall apply to all radiographic x-ray inspections of steel pipe joints of every size within the pipe size ranges given in the bid item text. This bid includes all labor, equipment, materials, to assess the acceptability of the weld to comply with specifications and to industry and regulatory standards. 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) for each pipe joint inspected.

# for US 42 GAS LINE RELOCATION Carrollton Utilities

February 2016

Prepared by:

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One Riverfront Plaza
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Louisville, Kentucky 40202
(502) 909-3234

# TECHNICAL SPECIFICATIONS **US 42 GAS LINE RELOCATION CARROLLTON UTILITIES**

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# SUMMARY OF WORK

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. Relocation of approximately 10,511 lineal feet of steel gas transmission main and related work in Carroll County, Kentucky.
- B. The Contractor shall provide all materials, labor and equipment necessary for completion of the Project. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the Project shall be included.
- C. Continuous Operations: The existing system must be maintained in continuous operation in such a manner that it meets all local, state, and federal requirements. The Contractor is responsible not to deactivate, demolish, or interfere with any system component required for the continuous operation until a new or temporary permanent-like system has been installed and is operational. The Contractor is responsible for payment of all fines resulting from any action or inaction on his part or the part of his subcontractors during performance of the Work that causes the facility/facilities to operate in an illegal manner or fail to operate in a legal manner.
- D. The construction of the following major Work items are included in the Contract:
  - 1. 10,511 lineal feet of 10-inch steel (0.250" wall) API5L, Gr X42 pipe
  - 300 lineal feet of HDD of 10-inch steel (0.250" wall) API5L, Gr X42 pipe across McCools Creek
  - 3. Two (2) 6-inch steel gas relocation (lowering) segments
  - 4. 124 lineal feet of 6-inch steel (0.188" wall) API5L, Gr X42 pipe
  - 5. Three (3) 6-inch gas tie-ins
  - 6. One (1) 4-inch gas tie-in
  - 7. Two (10) above grade 10-inch isolation valve assemblies
  - 8. Two (2) 6-inch buried steel gas valves
  - 9. Two (2) 4-inch buried steel gas valves
  - 10. Four (4) pressure regulator relocations
  - 11. Five (5) steel gas service relocations
  - 12. Cathodic protection system and test stations

# 1.2 PERMITS

A. The Contractor shall obtain any permits related to or required by, the Work in this Contract.

#### 1.3 CODES

A. Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations and similar communications, to the Owner.

# 1.4 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which a portion must remain functional. The Contractor must maintain the required items and/or systems functional without additional effort by the Owner's personnel and at no extra costs to the Owner.
- B. The Contractor is responsible for verifying all existing conditions, elevations, dimensions, etc., and providing his finished work to facilitate existing conditions.

# **WORK SEQUENCE**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. The Contractor shall conform to all miscellaneous requirements as contained in the Contract.
- B. The Contractor shall perform all Work included in the Contract Documents [Drawings].
- C. The Contractor shall perform the entire Work incidental to the items shown in the Contract Documents [Drawings] even though it may not be specifically enumerated.
- D. The Contractor will have to perform the work in a sequence acceptable to the Owner, and in some instances the Work will have to be performed in a sequence directed by the Owner.
- E. Further, the Contractor shall have to perform all the Work included in this project in a sequence that does not cause undue hardships on day-to-day operating personnel.

# 1.2 RELATED REQUIREMENTS

- A. Section 01010 Summary of Work.
- B. Section 01040 Coordination.

# PART 2 - PRODUCTS (NOT APPLICABLE)

# PART 3 - EXECUTION

# 3.1 SCHEDULING THE SEQUENCE OF CONSTRUCTION OPERATIONS

- A. Carrollton Utilities (CU) provides high pressure gas transmission services to major industry along the US 42 corridor. There will be no interruption of service for the gas relocation work. Service must be maintained at all times.
- B. The Contractor shall submit to the Engineer and CU, for review and approval, a complete schedule (progress chart) of his proposed sequence of construction operations and tie-ins prior to commencement of the work. A suggested tie-in sequence and tie-in procedures is provided on Drawings G-21 and G-22. Ultimately, the Contractor will be responsible for developing a tie-in sequence and procedures, which will require approval by the Engineer and CU.
- C. The Engineer will neither consider nor approve a construction schedule that fails to utilize the entire time allocated by the Contract for the construction of the Project.
- D. The Contractor shall schedule the various construction activities to complete the Project throughout the entire Contract time period. This schedule requirement shall not prevent the Contractor from completing the Project in a shorter time frame than illustrated in the schedule. The construction schedule along with a cost breakdown schedule shall be reviewed and approved by the Owner prior to the submission of the first partial payment request in accordance with the General Conditions.
- E. A copy of the construction schedule shall be submitted to the Owner with each pay request, appropriately marked to indicate the actual progress of the work compared to the planned schedule. This revised schedule must be approved by the Owner prior to payment.

# **SUBMITTALS**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

A. Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

# 1.2 DEFINITIONS

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

# 1.3 CONTRACTOR'S ULTIMATE RESPONSIBILITY

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

# 1.4 GENERAL REQUIREMENTS FOR SUBMITTALS

- A. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Documents. Where applicable, show fabrication, layout, setting and erection details. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus three (3) which will be retained by the Engineer and Owner. Shop drawings shall be folded to an approximate size of 8-1/2 inch x 11 inch and in such manner that the title block will be located in the lower righthand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

- C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. All submittals shall be referenced to the applicable item, section and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s) and shall be accompanied by transmittal forms in the format provided by the Engineer.
- E. The Contractor shall review and check submittals, and indicate his review by initials and date.
- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefor. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.
- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- Submittals for all electrically operated items (including instrumentation and controls) shall
  include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding,
  all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

# 1.5 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers and similar data.
- B. Coordinate each submittal with requirements of Work and Contact Documents.
- C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

# 1.6 SUBMITTAL SCHEDULE

- A. At a minimum the following submittals shall be submitted for review and approval:
  - 1. Work Sequence
  - 2. Tie-In Sequence, Procedures and Details for Gas Main and Industrial Services Tie-Ins,
  - 3. Steel Pipe and Fittings
  - 4. Horizontal Directional Drill Plan
  - 5. Gas Line Markers
  - 6. Above Grade Isolation Valve Assembly
  - 7. Buried Steel Gas Valves
  - 8. Cathodic Protection System and Test Stations
  - 9. Pressure Regulator Assembly

# SHORING AND BRACING

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Shore and brace sidewalls in excavations with steel sheet piles with wale systems or soldier piles with timber lagging and tie back system as required to protect existing buildings, utilities, roadways, and improvements.
- B. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.
- C. Geotechnical investigation borings, if applicable, were drilled for this project where indicated on the drawings in the report. The geotechnical report was not prepared for purposes of bid development and the accuracy of the report is limited. The Contractor should confer with a geotechnical engineer and/or conduct additional study in the area to obtain the specific type of geotechnical information required for construction and for preparation of bids.

# 1.2 SUBMITTALS

A. Provide copies of information on methods of the shoring and bracing system proposed for the work, design basis, calculations where applicable, and copies of shop drawings for inclusion in the project and job-site record files.

# 1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Shoring and bracing system design shall be prepared and sealed by a registered professional engineer or structural engineer. The system design shall provide the sequence and method of installation and removal. Shoring and bracing system design shall be in accordance with Occupational Safety and Health Administration (OSHA) requirements 29 CFR Section 1926.652.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Steel Sheet Piles: Heavy-gauge steel sheet.
- B. Soldier Piles: Steel H-beams.
- C. Timber Lagging: Heavy timber. Pressure treated with wood preservative for use below water table for extended time period.

# PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install in proper relation with adjacent construction. Coordinate with work of other sections.
- B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

# **ROCK REMOVAL**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. The Contractor shall excavate rock, if encountered, as required to perform the required work, and shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.
- B. In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid.

# 1.2 REFERENCES

- A. NFPA 495 Code for the Manufacture, Transportation, Storage and use of Explosive Materials.
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

# 1.3 REGULATORY REQUIREMENTS

- A. Conform to Kentucky Department of Mines and Minerals code for explosive disintegration of rock.
- B. Obtain permits from local authorities having jurisdiction before explosives are brought to site or drilling is started.
- C. KRS 351.330
- D. 805 KAR Chapter 4

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Rock definition: Solid mineral material that cannot be removed with a power shovel.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- D. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

# PART 3 - EXECUTION

# 3.1 EXPLOSIVES

- A. The Contractor shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. He shall notify the Engineer, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distance from the explosives. When the need for explosives has ended, all such materials remaining on the Work shall be promptly removed from the premises.
- B. The Contractor shall observe all state, federal and municipal laws, ordinances and regulations relating to the transportation, storage, handling and use of explosives. In the event that any of the above-mentioned laws, ordinances or regulations require a licensed blaster to perform or supervise the Work of blasting, said licensed blaster shall, at all times have his license on the Work and shall permit examination thereof by the Engineer or other officials having jurisdiction.

# 3.2 BLASTING PRECAUTIONS

- A. No explosives shall be used within 20 feet of:
  - 1. Building and/or structures existing, constructed or under construction.
  - 2. Underground and/or overhead utilities whether existing or partially constructed.
- B. Permission for any deviation from the restriction set forth above shall be secured from the Engineer, in writing; however, permission for any such deviations shall not relieve the Contractor from any responsibility in the event of damage to buildings, structures or utilities.
- C. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.
- D. The Contractor shall be solely responsible for his blasting operations. The Contractor shall not hold the Owner and/or the Engineer liable for any damages resulting from his blasting operations on this project.

# 3.3 PREBLAST STRUCTURE SURVEY

- A. Perform a preblast survey to determine and document with pictures the condition of adjacent structures, utilities, wells, buried cables, and other features within a minimum of 400 ft. of the blast area unless otherwise required by applicable regulatory authorities. Determine safe distances to structures or other facilities according to NFPA 495, Appendix B. Where facilities are closer than these distances, and natural barriers are not present, or when the amount of explosive cannot be reduced economically, blasting mats shall be used. Provide mats to protect environmentally sensitive areas, trees within 20 feet from the blasting area, streams, and rock formations from throw rock.
- B. Purpose of survey is to document existing condition of structures prior to blasting, and is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as result of blasting.
- C. Conduct survey prior to start blasting.
- D. Record information for each structure surveyed:
  - 1. Age and type of construction.
  - 2. Location and character of cracks.
  - 3. Evidence of settlement and leakage.
  - 4. Other pertinent information.
- E. Record preblast survey information on forms prepared specifically for preblast surveys.
- F. Supplement written records with photographs or videotape recordings.
- G. Submit copies of written records and photographs or videotapes to respective property owner, as well as, OWNER and ENGINEER, prior to start of blasting.

# 3.4 BLAST DESIGN

- A. Design each blast to avoid damage to existing facilities, adjacent property, and completed Work. Consider effects of blast-induced vibrations and air blast, and fly rock potential in design of each blast.
- B. Whenever peak particle velocity exceeds vibration limits, change design of subsequent blasts, as necessary to reduce peak particle velocity to within limits established by BIC.
- C. Whenever air blast exceeds limits, change design of subsequent blasts or provide controls necessary to reduce air blast to within specified limits.

#### 3.5 VIBRATION LIMITS

A. General: Establish appropriate maximum limit for vibration for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to vibration, and federal, state, or local regulatory requirements, but not to exceed 1.25 in/sec.

#### 3.6 AIR-BLAST LIMITS

A. Establish appropriate maximum limit for air blast for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to air blast, and federal, state, or local regulatory requirements, but not to exceed 0.015 psi peak overpressure (133 decibels).

# 3.7 FLY ROCK CONTAINMENT

A. Where fly rock may damage existing facilities, adjacent property, or completed Work, cover area to be blasted with blasting mats or provide other means that will contain and prevent scattering of blast debris.

#### 3.8 VIBRATION AND AIR-BLAST MONITORING

- A. Monitor and record blast-induced vibrations and air blast using suitable sensors and recording equipment for each blast.
- B. Contractor shall provide two (2) seismographs during blasting operations capable of the following:
  - 1. Designed for monitoring blast-induced vibrations and air blast. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
  - 2. Flat vibration frequency response between 4- and 200-Hz.
  - 3. Capable of recording air-blast overpressure up to 140 decibels.
  - 4. Flat air-blast frequency response between 2- and 500-Hz.
- C. Monitor on, or at, structures or other facilities that are closest to point of blasting. Monitoring more distant facilities that are expected to be sensitive to blast-induced vibrations and air blast.
- D. BIC shall supervise establishment of monitoring programs and initial operation of equipment; review interpretation of records and recommend revisions of blast designs.
- E. Include following information in blasting plan.
  - 1. Vibration and air-blast limits as recommended by BIC.
  - 2. Name of qualified BIC who will be responsible for monitoring program and interpretation of records.
  - 3. Types and models of equipment proposed for monitoring.
  - 4. Numbers and locations of proposed monitoring stations.
  - 5. Procedures to be used for coordinating recording of each blast.
  - 6. Steps to be taken if blasting vibrations or air blast exceed limits.

# 3.9 EXPLOSIVES

A. The CONTRACTOR shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. Notify the OWNER, in advance, of provisions to store and use explosives.

#### 3.10 BLASTING PRECAUTIONS

- A. Permission for any deviation from the blasting plan and other specified restrictions shall be secured from the OWNER and applicable authorities, in writing; however, permission for any such deviations shall not relieve the CONTRACTOR from any responsibility in the event of damage to buildings, structures or utilities.
- B. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.

C. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold the OWNER and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

#### 3.11 BLASTING RECORDS

- A. For each blast, document the following:
  - 1. Location of blast in relation to Project stationing or state plane coordinate system and elevation.
  - 2. Date and times of loading and detonation of blast.
  - 3. Name of person in responsible charge of loading and firing.
  - 4. Details of blast design, as previously specified.
  - 5. Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.
  - Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.
  - 7. Comments by BIC regarding damage to existing facilities, adjacent property, or completed Work, misfires, fly rock occurrences, unusual results, or unusual effects as required.

# 3.12 SUSPENSION OF BLASTING

- A. In event damage to existing facilities, adjacent property, or completed Work occurs due to blasting, immediately suspend blasting and report damage to ENGINEER and OWNER. CONTRACTOR shall be responsible for all costs of repairs or replacement due to damage from blasting.
- Before resuming blasting operations, adjust design of subsequent blasts, or take other appropriate measures to control effects of blasting, and submit complete description of proposed changes for reducing potential for future damage.
- C. Do not resume blasting until authorized by OWNER and applicable regulatory authorities.

# 3.13 ROCK REMOVAL B MECHANICAL METHOD

- A. Excavate and remove rock by the mechanical method. Drill holes and utilize mechanical impact to fracture rock.
- B. In utility trenches, excavate 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- Stockpile excavated materials and reuse select materials for site landscaping. Remove and dispose of excess materials offsite at approved location.
- D. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02220.

# 3.14 PAYMENT

A. Rock excavation shall be bid as unclassified and will **not** be paid for separately.

# EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall make excavations in such widths and depths as will give suitable room for below grade vaults, laying pipe to the lines, grades and elevations, furnish, place and compact all backfill materials specified herein or denoted on the Drawings. The materials, equipment, labor, etc., required herein are to be considered as part of the requirements and costs for installing the various pipes, structures and other items they are incidental to.

#### 1.2 RELATED WORK

- A. Section 02221- Rock Removal
- B. Section 15090 Gas Pipe and Fittings

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Crushed stone material shall conform with the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.
- B. Two classes of crushed stone material are used in this Section. The type of material in each class is as follows:
  - 1. Class I No. 9 Aggregate.
  - 2. Class II Dense Graded Aggregate (DGA).

# PART 3 - EXECUTION

# 3.1 EXCAVATION OF TRENCHES

- A. Unless otherwise directed by the Engineer, trenches are to be excavated in open cuts.
  - 1. Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to, or just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed.
  - 2. Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery. However, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.
- B. Trenches shall be sufficient width to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
  - The Contractor shall remove only as much of any existing pavement as is necessary for the
    prosecution of the Work. The pavement shall be cut with pneumatic tools, without extra
    compensation to the Contractor, to prevent damage to the remaining road surface. Where
    pavement is removed in large pieces, it shall be disposed of before proceeding with the
    excavation.
- C. All excavated materials shall be placed a safe distance back from the edge of the trench.

- D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor.
- E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
- F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

# 3.2 GAS PIPE BEDDING

- A. Piping for gas mains shall be supported as follows:
  - 1. The trench bottom for gas main piping shall be stable, continuous, relatively smooth and free of frozen material, clodded dirt, foreign material and rock or granular material larger than 1/2 inch in diameter. The foundation for gas main piping shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. Any uneven areas in the trench bottom shall be shaved-off or filled-in with Class I granular bedding. When the trench is made through rock, the bottom shall be lowered to provide 6 inches of clearance around the pipe. Class I granular bedding shall be used to bring the trench bottom to grade.
- B. After each pipe has been brought to grade, aligned, and placed in final position, earth material for gas main piping in areas not subject to vehicular traffic and Class I material for gas mains in paved areas, shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations.
- C. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- D. Where an unstable (i.e., gas, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate.
- E. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required Class I bedding material can be placed.
- F. It should be noted that no pipe shall be laid on solid or blasted rock.
- G. Pipe bedding as required in Paragraphs A, B, C, and D of this Section is **not** considered a separate pay item.

# 3.3 GAS PIPE BACKFILLING

- A. Initial Backfill:
  - 1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 6 inches above the top of the pipe. For gas main piping in areas not subject to vehicular traffic, initial backfill material shall be earth material free of rocks, acceptable to the Engineer or with Class I material when a condition exists mentioned in Paragraph A, 3. below. For gas main piping in paved areas, initial backfill shall be Class I material.

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- 2. Material used, whether earth or Class I, in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of gas main.
- 3. In areas where large quantities of rock are excavated and the available excavated earth in the immediate vicinity is insufficient for placing the required amount of backfill over the top of the pipe as set forth in Paragraph A.1, the Contractor shall either haul in earth or order Class I material for backfilling over the pipe. Neither the hauling and placement of earth nor the ordering and placement of Class I material to fulfill the backfill requirements set forth herein is considered a separate pay item.

# B. Final Backfill:

- 1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
  - a. Case I Areas not subject to vehicular traffic.
  - b. Case II Paved areas including streets, drives, parking areas, and walks.
- 2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
  - a. Case I The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 8 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The remainder of the trench shall be backfilled with earth material reasonably free of any rocks.
  - b. Case II The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 12 inches below the existing pavement surface with Class I (No. 9 crushed stone aggregate) material. The backfill shall be mechanically tamped in approximately 6-inch layers to obtain the maximum possible compaction. The remaining backfill shall be as follows:
  - c. For gravel surfaces Class II (dense graded aggregate) material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
  - d. For bituminous and concrete surfaces Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
- 3. Earth and Class I material used in final backfill is not a separate pay item. Payment shall be included in the price of gas main.
- 4. Class II material used in final backfill shall be included in the unit price of the pipe.
- C. A sufficient amount of Class II material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

#### 3.4 COMPACTION

- A. Place backfill in 6- to 8-inch lifts and compact thoroughly.
- B. Granular Material
  - 1. Field compaction shall consist of vibratory plate
  - 2. Obtain 85% relative density (ASTM-4253 and D-4254)
- C. Earth Material
  - 1. Field compaction shall consist of self propelled sheepsfoot or pad foot
  - 2. Obtain 90% standard density (ASTM D-698)

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# 3.5 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed and shall be Lineguard brand encased aluminum foil, Type III. The identification tape is manufactured by Lineguard, Inc., P.O. Box 426, Wheaton, IL 60187.
- B. The identification tape shall bear the printed identification of the utility line below it, such as "Caution Buried Below". Tape shall be reverse printed; surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be 2 inches in width. Colors are: yellow gas, green gas, red electric, blue gas, orange telephone, brown force main.
- C. The tape shall be the last equipment installed in the trench so as to be first out. The tape shall be buried 4 to 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to the Owner or Engineer.

# HORIZONTAL DIRECTIONAL DRILLING

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - Labor, materials, machinery, and construction equipment required to construct entry and
    exit pits and associated shoring and sheeting (actual size and depth to be determined by the
    Contractor) and perform in a good workmanlike manner all horizontally-controlled
    directional drilling for the installation of approximately 300 lineal feet of steel gas main
    under McCool's Creek as indicated on the Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 15061 Gas Pipe and Fittings

# 1.2 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Society for Testing and Materials (ASTM):
    - a. F1962, Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.

#### B. Qualifications:

- 1. Directional drilling and pipe installation shall be done only by an experienced Contractor specializing in directional drilling and whose key personnel have at least 5 years experience in this work. Furthermore, the Contractor shall have the following minimum experience:
  - a. Successfully completed a minimum of five (5) HDD installations in the last 5 years that were 10-inch diameter and up to 1,000 feet.
  - b. At least three (3) of the projects shall have utilized gas steel pipe for river crossing.

# 1.3 SUBMITTALS

- A. Shop Drawings:
  - 1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
  - 2. Product technical data including:
    - a. Certification from the pipe and fitting manufacturer that all of the materials used to manufacture the pipe and fittings meet the requirements of this specification and the referenced standards.
    - Products information, material specifications, material composition, and handling procedures.
    - c. Material safety data sheets and special precautions required.
    - d. Method of mixing and application.
  - 3. The Contractor shall prepare and submit a detailed schedule for the work. The schedule shall include all major tasks including, but not limited to, the following:
    - a. Manufacture of steel pipe and fittings.
    - b. Pipe delivery to the project site.
    - c. Drill rig mobilization and setup.
    - d. Pipe stringout and assembly.
    - e. Beginning and completing the pilot hole drilling.
    - f. Beginning and completing the pre-reaming.
    - g. Beginning and completing the pipe pull-back.
    - h. Hydrostatic pressure testing.
    - i. Disposal of drilling fluids.
    - j. Cleanup, site restoration and demobilization.

- 4. At least 15 days prior to mobilizing drilling equipment, the Contractor shall submit a detailed plan to the Engineer for review. The plan shall include the following:
  - a. Pilot hole drilling procedure, reaming operation, pullback procedure, ballasting, internal gauging, hydrostatic testing, and dewatering procedures.
  - b. Equipment, solids control plant, and pipe string layout plan.
  - c. Calculations showing anticipated maximum pipe stresses during pull-back, required and maximum drilling fluid pressures, and safety factors for potential inadvertent return of drilling fluid due to soil hydrofracture.
    - 1) The calculations shall be sealed by a Professional Engineer.
  - d. Emergency response plan for inadvertent return of drilling fluid.
- 5. It is anticipated that the pipeline will be installed in one continuous length; therefore no pipe joining during pull-back is anticipated. If proposed by the Contractor, such pipe joining must be submitted with full details of methods and performance for approval by the Engineer at least ten (10) days in advanced of proposed operations. Contractor bears sole risk and responsibility for proving the acceptability of such pipe joining and associated work
- 6. Following completion of the pilot hole drilling, the Contractor shall submit a detailed plan and profile of the bore plotted at a scale no smaller than 1 IN equals 20 FT horizontally and 1 IN equals 10 FT vertically. (The Contractor may make changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points, provided these changes are first submitted in writing and agreed to by the Owner and Engineer.)

# 1.4 COMPLETION OF DIRECTIONAL DRILLING

- A. If a directional drilled pipeline is not successfully installed or the Contractor abandons the effort, he will forfeit all payments for that HDD crossing under this Contract.
- B. Completion and successful testing of the approved pipeline will entitle the Contractor to full payment for the Contract unit price for the HDD crossing, less retainage for site restoration, which sum shall be determined by the Owner, but in no case greater than ten (10) percent of the Contract lump sum price.
- C. In the event of his failure to install the directional drilled pipeline, the Contractor shall retain possession of the steel pipe and remove it from the site. The bore hole beneath land shall be completely filled with grout or sand to prevent future settlement. If the steel pipe cannot be withdrawn, it shall be cut off at least 3 feet below the ground and capped with a blind flange. The annular space shall be grouted at the Contractor's expense.

# PART 2 - PRODUCTS

# 2.1 GENERAL

A. The Contractor shall provide all materials, equipment, and labor for completing the subaqueous crossings and for adequate protection of the Work.

#### 2.2 MATERIALS

- A. Refer to Specification Section 15061 for steel pipe.
- B. Drilling Materials:
  - 1. The drilling materials used by the Contractor to aid in the horizontal drilling operations shall be of the Contractor's choosing. Products shall comply with environmental regulations applicable to this project.

#### C. Drilling Fluids:

- 1. Drilling fluids used in the drilling operation shall be a mixture of bentonite and water or such other fluids of the Contractor's choosing.
- 2. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Owner.

The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

#### PART 3 - EXECUTION

#### 3.1 COORDINATION OF WORK

- A. The Contractor shall coordinate his work with the agencies, corporations, and individuals owning or having jurisdiction of land in the project vicinity including, but not necessarily limited to:
  - 1. Corps of Engineers
  - 2. KYTC
- B. The Contractor shall be required to construct test pits to locate existing underground utilities and/or structures in advance of construction. Test pits shall be excavated and backfilled by the Contractor so as not to create a hazardous area. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Owner.
- C. The Contractor shall have the option of securing additional construction easements in different locations if desired to accommodate his construction method. In this case, the Contractor shall notify the Engineer of his intention to secure additional easements. The cost of negotiating and obtaining these easements shall be borne by the Contractor.
- D. Drilling water required for drilling may be purchased from Carroll County Water District or Carrollton Utilities. Contractor is responsible for purchasing, transporting and storing any water required. River or pond water shall not be used for any purpose in the construction. Securing permission to use water from any other source is the responsibility of the Contractor.
  - 1. The Contractor shall coordinate with CU to identify available source points for water. Any source point is subject to the approval of CU.
  - The Contractor shall furnish and install any required backflow preventers, valves and adapters.
  - 3. The quantity of water that the Contractor may use for construction purposes may be limited by flow rate (gallons per minute), time of day, and/or the needs of the water utility, including firefighting.
  - 4. All water for drilling shall be paid for by the Contractor at the water utility's prevailing rates.

# 3.2 CONSTRUCTION LAYOUT

A. The Contractor shall employ Kentucky licensed land surveyors to locate the positions of the entry and exit points, established elevation and horizontal datum for the borehead control, and layout for the pipe assembly area.

#### 3.3 INSTALLATION

- A. General:
  - The Contractor shall install the pipeline under the river and its adjacent banks by the
    horizontally drilled, directionally controlled method of construction. The horizontally
    drilled, directionally controlled method shall consist of the drilling of a small diameter pilot
    hole in a vertical arc from one side of the river to the other followed by an enlarged
    diameter hole for the steel pipeline insertion. The exact method and techniques for
    completing the directionally drilled crossing shall be determined by the Contractor, subject
    to the requirements of these Specifications.
  - 2. The Contractor shall comply with the applicable portions of ASTM F1962.
- B. Pipe Stringout:

- 1. The Contractor shall elevate the pipe stringout if required, to provide access to private property.
- The Contractor shall comply with any and all additional restrictions of affected property owners.
- 3. Utilities may be present in the stringout area, and adequate precautions must be taken by the Contractor to prevent damage to the utilities, as required by each utility owner.

#### C. Instrumentation:

- The Contractor will provide and maintain instrumentation which will accurately locate the
  pilot hole at all times. The Contractor shall provide and use a separate steering system
  employing a ground survey grid system, such as "TRU-TRACKER" or equal wherever
  possible.
- The Contractor will provide and maintain instrumentation which will accurately measure drilling fluid flow discharge rate and pressure.
- 3. The Contractor shall provide continuous access to these instruments and their readings to the Owner and Engineer at all times.

#### D. Tolerances:

- Steel pipe installed by the horizontally drilled directionally controlled method must be located in plan as shown on the Drawings, and must be within the elevation limits shown on the Drawings. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 50 feet. This "as-built" plan and profile shall be updated continuously as the pilot bore is advanced. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to the position or inclination of the pilot bore shall be withheld from the Owner or Engineer. At the completion of the pilot hole, the Contractor shall provide the Engineer with the coordinates of the pilot hole. The entry point location of the pilot hole shall initially penetrate the ground surface at the location shown on the Plan and Profile Drawings. The Contractor will stake this location in the field.
- 2. The Contractor shall make every effort to have the exit point located where shown on the Plans. In no case shall the actual exit point be located farther than 10 feet (along the length of the pipe) from the intended exit point or more than 5 feet on either side perpendicular to the pipe at the exit point location shown. The entire pipe must be within the permanent easement and/or permitted location.
- 3. The alignment of the pilot boring must be such that the pipe can be strung out in a straight line. If the pilot bore fails to conform to the above tolerances, the Engineer may, at his option, require a new pilot boring be made, at no additional cost the Owner. The Contractor will stake this location in the field.
- 4. The Contractor shall at all times handle the high density polyethylene pipe in a manner that does not overstress the pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the Contractor at his expense. The maximum allowable tensile load imposed on the steel pipe shall be within the limits of the pipe grade and wall section strengths. The Contractor shall be responsible for determining pulling loads required for his method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation. Protect interior and exterior surfaces at all times.

#### E. Entry and Exit Pits:

- 1. Approximate locations of entry and exit pits are shown on the Drawings, subject to the restrictions of the landowners and applicable provisions below:
  - Erosion protection and sediment control BMPs shall be installed in accordance local regulations. The Contractor shall implement BMPs to accommodate his sequence and method of construction.
  - b. Trenching shall be in accordance with Specification Sections 02225.

# 3.4 REAM AND PULL BACK

- A. Prereaming: Prereaming operation shall be conducted at the discretion of the horizontal drilling Contractor. All provisions of this specification relating to simultaneous reaming and pulling back operations shall also pertain to prereaming operations.
- B. Pulling Loads: The Contractor shall be responsible for determining pulling loads required for this method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation.
- C. Torsional Stress: A swivel shall be used to connect the pipeline pull section to the reaming assembly to minimize torsional stress imposed on the section.
- D. Buckling Stress: Contractor shall fill the pipe with clean water, as installation proceeds, as required to prevent buckling and reduce buoyancy.
- E. Pull Section Support: The pull section shall be supported as it proceeds during pull back so that it moves freely and the pipe exterior is not damaged.
- F. Pull Section Length: If space allows, the pull section shall be installed in one continuous length with no tie-in joints. If space is not available, tie-in joints shall be minimized and fully inspected prior to installation.

#### 3.5 OVERPULLING

A. After the high density polyethylene pipeline has been pulled into the reamed pilot hole, the pipe shall be pulled so that at least 3% of the HDD pipeline length is exposed on the end of the bore. The pulling force shall be relieved, and the pipe allowed to "relax" while the pipe is still connected to the pulling head. The Contractor shall allow a time period equal to the total pullback time for the pipe to recover from its elastic strain and visco-elastic stretch, but in no case shall this time be less than 24 hours.

# 3.6 HANDLING OF DRILLING MUD AND CUTTINGS

- A. The HDD operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to nearby waterways. The Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.
- B. The general work areas on the entry and exit sides of the crossings shall be enclosed by a berm to contain unplanned spills or discharge.
- C. Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desilter/desander, centrifuges, material handlers, and haulers, all in a quantity sufficient to perform the cleaning/separating operations without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by Contractor to the extent necessary for legal disposal in off-site landfills. Water from the dewatering process shall be treated by Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.
- D. Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.
- E. Disposal of drilling fluids and cuttings shall be the responsibility of the Contractor and shall be conducted in compliance with all relevant environmental regulations, right-of-way and work space agreements and permit requirements. Bentonite slurry used during the horizontal drilling process shall not be disposed of on-site, but shall be hauled away in watertight trucks to a legal disposal facility. All costs related to disposal shall be borne by the Contractor.

F. Inadvertent drilling fluid returns at locations other than the entry and exit points shall be minimized. Contractor shall immediately clean-up any inadvertent returns.

#### 3.7 TESTING

- A. Testing:
  - 1. See Section 15061.
- B. Pipe Gauging:
  - 1. The Contractor shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-roundness, and any other deformations.
  - 2. The sizing pig run shall be considered acceptable if the survey results indicate that there are no sharp anomalies (e.g., dents, buckles, gouges, and internal obstructions) greater than 2% of the nominal pipe diameter, or excessive ovality greater than 5% of the nominal pipe diameter.
    - For gauging purposes, dent locations are those defined above which occur within a span
      of five feet or less.
    - b. Pipe ovality shall be measured as the percent difference between the maximum and minimum pipe diameters. For gauging purposes, ovality locations are those defined above which exceed a span of five feet.

# 3.8 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, existing pipe and appurtenances removed by the Contractor, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

# **CAST-IN-PLACE CONCRETE**

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

- A. Formwork.
- B. Reinforcing Steel.
- C. Expansion and Contraction Joints.
- D. Waterstops
- E. Concrete.

# 1.2 RELATED REQUIREMENTS

A. Section 02225 – Excavation, Backfilling and Compacting for Utilities.

#### 1.3 REFERENCES

- A. ACI 350R Environmental Engineering Concrete Structures.
- B. ACI318 Building Code Requirements for Reinforced Concrete.
- C. ACI347 Recommended Practice for Concrete Formwork.
- D. CRSI Manual of Standard Practice.
- E. CRSI Placing Reinforcing Bars.
- F. ASTM A-615, A-120, A-185, C-31, C-39

# 1.4 SUBMITTALS

- A. The Contractor shall submit the following data to the Engineer for review:
  - . Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
  - 2. Certification by the manufacturer that cement meets the Specification contained herein.
  - 3. Shop drawing for reinforcing steel showing bar schedules, location, and splices.
  - 4. Reports on laboratory compression tests of cylinders taken during concrete placement.
  - 5. Manufacturer's cut sheets for all other concrete related products.

#### PART 2 - PRODUCTS

#### 2.1 CLASSES OF CONCRETE AND USAGE

- A. Structural concrete of the various classes required shall be proportioned to produce the following 28-day compressive strengths:
  - 1. Selection of Proportions for 4,500 psi Concrete:
    - a. 4,500 psi compressive for strength at 28 days.
    - b. Type I/II cement plus air.
    - c. Maximum water/cement ratio 0.42.
    - d. Minimum cement content 564 lbs. (6.0 bags)/cubic yard concrete.
    - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
    - f. Air content 5% plus or minus 1% by volume.
    - g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture. Additional slump is allowed by use of water reducing or superplasticizing admixtures.

- 2. Selection of Proportions for 3,000 psi Concrete:
  - a. 3,000 psi compressive strength at 28 days.
  - b. Type I/II cement plus air.
  - c. Maximum water/cement ratio 0.56.
  - d. Minimum cement content 470 lbs. (5.0 bags)/cubic yard concrete.
  - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
  - f. Air content 5% plus or minus 1% by volume.
  - g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture.
- B. Concrete shall be used as follows:
  - 1. 4,500 psi concrete for all concrete work except as noted below.
  - 2. 3,000 psi concrete for encasement of piping where indicated, and thrust blocking.
- C. All testing of aggregates and determination of proportions shall be or have been performed by a recognized independent testing laboratory.
- D. Cement for exposed concrete shall have a uniform color classification.
- E. Type I/II cement conforming to ASTM C-150 shall be used in all concrete.
- F. Coarse aggregate shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amount of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to all requirements of ASTM C-33.
- G. Fine aggregates shall be natural sand having clean, hard, uncoated grains, free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33.
- H. Water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

# 2.2 ADMIXTURES

- A. An air entraining admixture shall be used on all concrete and shall be the neutralized vinsol resin type such as Master Builders MB-VR, Euclid Chemical Company AIR-MIX or equivalent. The admixture shall meet the requirements of ASTM C-260.
- B. Other admixtures (water reducing agents, acellerating agents, retarding agents, superplasticizing agents) shall be considered where necessary to meet the needs of construction.
- C. Admixtures shall be used in concrete design mixes in the same manner and proportions as in the field so that the effects of the admixtures are included in preliminary test submitted to the Engineer for review prior to the start of construction.

# 2.3 REINFORCEMENT

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615. All bar reinforcement shall be deformed.
- B. Welded wire fabric shall conform to ASTM A-185 and shall be of weight and gauge as indicated on the Drawings.
- C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved highdensity polyethylene tips so that the metal portion shall be at least one-quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

# 2.4 FORMS

- A. Forms shall be of suitable material, design, and construction so as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces with a tolerance of 1/16-inch in 4 feet.
- B. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gauge metal, new plywood (used plywood which, in the opinion of the Engineer, is substantially equal to new plywood may be used), tempered wood fiberboards with smooth surface, or similar materials. Metal forms or form linings shall have square edges so that the concrete will not have fins or fluting. Forms shall not be pieced out by use of materials different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface.
- C. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, metal, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Metal forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16-inch.
- D. Form for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms for exposed surfaces shall be built with 3/4-inch chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.
- F. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
  - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1 inch to the face of the concrete.
  - 2. That part of the tie which is to be removed shall be at least 1/2-inch in diameter, or if smaller, it shall be provided with a wood or metal cone 1 inch long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
  - 3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

#### 2.5 OTHER MATERIALS

- A. Anchorage items shall be of standard manufacture and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the Engineer.
- B. Premolded expansion-joint filler strips shall conform to ASTM D-1752 and shall be 3/8-inch thick unless otherwise shown.
- C. Joint sealants shall conform to ANSI 116.1. The following joint sealants are acceptable:
  - 1. Colma by Sika Corporation.
  - 2. Hornflex by A. C. Horn, Inc.
  - 3. Sonolastic by Sonneborn Division of Contech, Inc.

#### D. Grout:

- 1. Precision-support grout shall consist of a non-shrink, ready-to-use, precision grout material; proportioned, pre-mixed and packaged at the factory; delivered to the job site to place with only the addition of water; forming, placing and curing as stipulated by the manufacturer.
- Grouts which depend upon aluminum powders, chemicals, or other agents which produce gas for expansion are not acceptable.
- 3. Precision-support grout shall also meet the following requirements:

- a. Free of gas producing agents.
- b. Free of oxidizing catalysts.
- c. Free of inorganic accelerators, including chlorides.

# E. Construction Joint Waterstops:

- 1. Polyvinylchloride (PVC) Waterstops:
  - a. Provide PVC waterstops complying with Corps of Engineers CRD-C572.
  - b. Provide serrated type with a minimum thickness of 3/8 inch by a minimum width of 6 inches may be provided in specific applications as approved by the ENGINEER.
  - c. Provide PVC waterstops as manufactured by Greenstreak Plastic Products company; Vinylex Corporation, or equivalent product.

# 2. Adhesive Waterstop:

- a. Provide pre-formed adhesive waterstop in construction joint locations where shown, or as alternative to PVC waterstop where appropriate.
- b. The preformed waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210A, "Sealing Compounds for Expansion Joints".
- c. Provide adhesive waterstops as manufactured by Synko-Flex Products, Division of Henry Products, Inc.; or equivalent product.
- 3. Hydrophilic Waterstops:
  - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
  - b. Provide waterstops as manufactured by Greenstreak Plastic Products Company; Adeka, Inc.; or equivalent product.
- F. Membrane Forming Curing compound: ASTM C 309, Type I-D.
  - 1. Provide without fugitive dye when requested by Engineer.
- G. Epoxy Bonding Agent: Provide two-component epoxy resin bonding agent as manufactured by Sika Chemical Corporation; A.C. Horn, Incorporated; or equivalent product.

#### H. Adhesive Dowels:

- 1. Drilling equipment used and installation of adhesive dowels shall be in accordance with manufacturer's instructions.
- 2. Assure that embedded items are protected from damage and are not filled in with concrete.
- 3. Unless otherwise shown or approved by Engineer, embedment depths shall be based on a compressive strength of 2,500 psi when embedded into existing concrete.)
- 4. The Contractor shall comply with the adhesive material manufacturer's installation instructions on the hole diameter. The Contractor shall properly clean out the hole utilizing a synthetic brush and compressed air to remove all loose material from the hole, prior to installing adhesive capsules or material. Proper mixing of the two-component system shall be done to the manufacturer's recommendations.
- 5. Adhesive material manufacturer's representative shall observe and demonstrate the proper installation procedures for the adhesive dowels and adhesive material at no additional expense to the Owner. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.
- 6. Provide two-component dowel installation adhesive as manufactured by Hilti Corporation, or approved equivalent product.

# PART 3 - EXECUTION

# 3.1 FORMING

- A. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions and to the elevations indicated on the Drawings or specified, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.
- B. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.

- C. All falsework to support structural slabs, beams, girders, etc., shall be designed to safely and adequately support the concrete and forms during placement and curing. The adequacy and safety of the falsework shall be the sole responsibility of the Contractor.
- All forms shall be oiled with an acceptable nonstaining oil or liquid form coating before reinforcement is placed.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.
- F. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of days-degrees\*:
  - 1. Beams and slabs: 500 day-degrees.
  - 2. Walls and vertical surfaces: 100 day-degrees.
  - 3. \*Day-degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily average temperature of 60 degrees F, equals 300 day-degrees.
- G. Shores under beams and slabs shall not be removed until the concrete has attained at least 60 percent of the specified compressive strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

# 3.2 PLACING REINFORCEMENT

- A. Reinforcement shall be bent cold to the dimensions and shapes shown on the Drawings and within tolerances specified in the CRSI Manual of Standard Practice.
- B. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- C. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- D. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- E. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- F. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

# 3.3 TESTING AGGREGATES AND DETERMINING PROPORTIONS

- A. No concrete shall be used in the work until the materials and mix design have been accepted by the Engineer.
- B. The conformity of aggregates to the Specifications hereinbefore given shall be demonstrated and determined by tests per ASTM C-33 made with representative samples of the materials to be used on the work.

- C. The actual proportions of cement, aggregates, admixtures and water necessary to produce concrete conforming to the requirements set forth herein shall be determined by making test cylinders using representative samples of the materials to be used in the work. A set of four standard 6-inch cylinders shall be made and cured per ASTM C-31. Two shall be tested at 7 days and two at 28 days per ASTM C-39. The slump shall not be less than the greatest slump expected to be used in the work.
- D. Reports on the tests and a statement of the proportions proposed for the concrete mixture, shall be submitted in triplicate to the Engineer for review as soon as possible, but not less than five days prior to the proposed beginning of the concrete work. If the Contractor furnishes in writing, similar, reliable detailed information from an acceptable source, and of date not more than four months prior to the time when concrete will be used on this project, the above requirements for laboratory test may be modified by the Engineer. Such data shall derive from mixtures containing constituents, including the admixtures where used, of the same types and from the same sources as will be used on this project.
- E. The Engineer shall have the right to make check tests of aggregates and concrete, using the same materials, and to order changes as may be necessary to meet the specified requirements.
- F. The Contractor may request permission to add water at the job site; and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case shall the total water per bag of cement exceed the ratio set forth herein.
- G. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

# 3.4 MIXING

- A. All central-plant and rolling-stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Association, as well as the ACI Standards for measuring, Mixing and Placing Concrete (ACI 614), and with the ASTM Standard Specification for Ready-Mixed Concrete, Designation C94, insofar as applicable.
- B. Ready-mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.
- C. Central-mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch, and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the premixed concrete is placed in the truck and shall continue without interruption until discharge. For transit-mixed concrete the major portion of the mixing water shall be added and mixing started immediately after the truck is charged.
- D. The amount of water initially added shall be recorded on the delivery slip for the Engineer's information; no additional water shall be added, either in transit or at the site, except as directed. Mixing (at mixing speed) shall be continued for at least 10 minutes followed by agitation without interruption until discharge. Concrete shall be discharged at the site within 1-1/2 hours after water was first added to the mix, and shall be mixed at least 5 minutes after all water has been added.
- E. Concrete which has become compacted or segregated during transportation to or in the site of the work shall be satisfactorily remixed just prior to being placed in the forms.
- F. Partially hardened concrete shall not be deposited in the forms. The retempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

# 3.5 COMPRESSION TESTS

- A. During the progress of the work, at least one (1) set of four (4) compression test cylinders shall be made for each 50 cubic yards of concrete or major fraction thereof, and not less than one such set for each type of concrete for each day's pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, Designation C31, except that wherever possible molds shall be left on the cylinders until they have reached the laboratory. Testing services to satisfy the requirements of ACI shall be paid for by the Contractor at his expense. Testing lab must be approved by the Engineer.
- B. One cylinder of each set shall be broken in accordance with ASTM C-39 at seven (7) days and the other two at twenty-eight (28) days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.
- C. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.

# 3.6 METALWORK IN CONCRETE

- A. All trades shall be notified, at the proper time, to install items to be embedded in concrete.
- B. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed, and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed.
- C. Anchor bolts shall be set by means of substantial templates.

#### 3.7 PLACING AND COMPACTING CONCRETE

- A. At least twenty-four (24) hours before the Contractor proposes to make any placement of concrete, he shall notify the Engineer of his intention and planned procedure. Unless otherwise permitted, the work shall be so executed that a section begun an any day shall be completed during daylight of the same day.
- B. No concrete shall be placed until the subgrade has been accepted in accordance with the requirements of Section 01400, Quality Control, nor shall it be placed on frozen subgrade or in water. Placement of concrete shall not be scheduled until the forms, reinforcing, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free form rust, scale, oil, or any other foreign matter.
- C. Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thorough wetted just prior to placement of concrete.
- D. Concrete placed at air temperatures below 40 degrees shall have a minimum temperature of 50 degrees F. and a maximum of 70 degrees F. when placed.
- E. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable and by methods which will prevent separation of ingredients and avoid rehandling.
- F. Chutes for conveying concrete shall be metal or metal-lined and of such size, design, and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall be not flatter than 1 on 2 and all parts of a chute shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or, if required, a spout; and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.

- G. In thin sections of considerable height (such as walls and columns), concrete shall be placed in such a manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, etc., shall be used as required or permitted unless the forms are provided with suitable openings.
- H. Chutes, hoppers, spouts, etc., shall be thoroughly cleaned before and after each run and the water and debris shall not be discharge inside the form.
- I. For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain, until the completion of the unit, an approximately horizontal, plastic surface.
- J. No wooden spreaders shall be left in the concrete.
- K. During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal-type mechanical vibrators operating at not less than 5,000 rpm., or other tool spading, to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried on in such a manner and only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface, shall be avoided.
- L. The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

# 3.8 BONDING CONCRETE AT CONSTRUCTION JOINTS

- A. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any, and then roughened.
- B. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which all pools shall be removed. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be 1/8-inch thick on vertical surfaces and 1/4-inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

# 3.9 CURING AND PROTECTION

- A. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slab, etc., shall be ponded to a depth of 1/2-inch wherever practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.
- B. For at least seven (7) days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F.
  - 1. No manure, salt, or other chemicals shall be used for protection.
  - 2. Wherever practicable, finished slabs shall be protected form the direct rays of the sun to prevent checking and crazing.

# 3.10 TRIMMING AND REPAIRS

- A. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.
- B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired.
- C. Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but less than 1 inch deep. The remaining concrete shall be thoroughly roughened and cleaned. Concrete around the cavity or the form-tie recess shall be thoroughly wetted and promptly painted with a 1/16-inch brush coat of neat cement mixed to the consistency of lead paint. The hole shall then be filled with mortar.
  - 1. Mortar shall be 1:1-1/2 cement and sand mix with sufficient white cement, or fine limestone screenings in lieu of sand, to produce a surface matching the adjoining work. Cement and sand shall be from the same sources as in the parent concrete.
  - 2. For filling form-tie recesses, the mortar shall be mixed slightly damp to the touch (just short of "balling"), hammered into the recess until it is dense and an excess of paste appears on the surface, and then troweled smooth. Mortar in patches shall be applied so that after partial set it can be compressed and rubbed to produce a finish flush and uniform in texture with the adjoining work. All patches shall be warm-moist cured as above specified.
- D. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the masonry replaced by means of a cement gun, or the masonry shall be taken down and rebuilt, all as the Engineer may decide or direct.

#### 3.11 SURFACE FINISH

- A. Fins and irregularities on formed surfaces to receive no other finish shall be smoothed.
- B. The top of concrete on which other concrete or unit masonry will later be placed shall be struck off true at the surface indicated on the Drawings or as permitted by the Engineer, as the concrete is being placed. As soon thereafter as the condition of the concrete permits and before it has hardened appreciably (normally within 2 hours after being deposited), all water, scum, laitance, and loose aggregate shall be removed from the surface by means of wire or bristle brooms in such a manner as to leave the coarse aggregate slightly exposed and the surface clean.
- C. Concrete surfaces shall be finished as follows, except as otherwise required by various sections of the Specifications or shown on the Drawings.
  - 1. Wood-float finish shall be given to all top, substantially horizontal, exposed surfaces.
  - 2. Burlap-rubbed finish shall be given to all interior and exterior surfaces placed against forms which will be exposed to view on completion of the work. (Finish shall be to one foot below ground and below normal liquid surface elevations).
  - 3. All surfaces shaped without forms and over which liquids will flow shall be given a steel-trowel finish.
  - Concrete surfaces to which roof insulation or roofing are to be applied shall be finished sufficiently smooth to receive the roofing material, as obtained by steel trowel or very smooth wood-float finish.

# 3.12 METHOD OF FINISHING

- A. Broomed Finish: Surfaces to be given broomed finish shall first be given a steel-trowel finish. Immediately after troweling, the surface shall be lightly brushed in one direction with a hair broom to produce a nonslip surface of uniformly good appearance.
- B. Wood-float Finish:
  - 1. Surfaces to be given a wood-float finish shall be finished by tamping with special tools to force aggregates away from the surface, and screeding with straight edges to bring the surface to the required line.

- 2. As soon after the condition of concrete permits and before it has hardened appreciably, all water, film, and foreign material which may work to the surface shall be removed. Rough finishing shall be done with straight edges and derbies. Machine floating if used, shall not be started until the surface will support the float adequately without digging in and bringing excess fines to the surface. At such time, a minimum of machine and hand floating with a wood float shall be employed to bring the finish to a true and uniform surface with no coarse aggregate visible.
- 3. Under no circumstances will sprinkling with water or dusting with cement be permitted during finishing of the slab.
- C. Steel Trowel Finish: Surfaces to be given a steel-trowel finish shall first be given a wood-float finish. This shall be followed by hand troweling with steel trowels to bring the surface to a uniform, smooth, hard, impervious surface free from marks and blemishes. Troweling shall not be started until all water has disappeared from the surface. Over-troweling shall be avoided. Dusting with dry cement or other mixtures or sprinkling with water will not be permitted in finishing.

# D. Burlap Rubbed Finish:

- Immediately after the forms have been stripped and before the concrete has changed in color, all fins and other projections shall be carefully removed by use of a hammer or other suitable means, and imperfections shall be repaired as hereinbefore specified under "Trimming and Repairs". While the surface is still damp, a thin coat of cement slurry of medium consistency shall be applied by means of bristle brushes to provide a bonding coat within pits and minor blemishes in the parent concrete; the coating of large areas of the surface with this slurry shall be avoided.
- 2. Before the slurry has dried or changed color, a dry (almost crumbly) grout composed of 1 volume of cement to 1-1/2 volumes of masonry sand shall be applied. The sand shall have a fineness modulus of approximately 2.25 and comply with the gradation requirements of the ASTM Standard Specifications for Aggregate for Masonry Mortar, Designation C144-76.
- 3. The grout shall be uniformly applied by means of damp (neither dripping wet nor dry) pads of burlap of convenient size (approximately 6 inches square) and shall be allowed to harden for one to two hours, depending on the weather. In hot, dry weather the surface shall be kept damp by means of a fine fog spray during the hardening period.
- 4. When the grout has hardened sufficiently, but before it becomes so hard as to be difficult to remove, excess grout shall be scraped from the surface of the parent concrete by the edge of a steel trowel, without removing the grout from the imperfections. Thereafter, the surface shall be allowed to dry thoroughly and then be rubbed vigorously with burlap to remove all dried grout so that no visible film remains on the surface after the rubbing. The entire cleaning operation for any area shall be so planned that sufficient time is allowed for the grout to dry and be rubbed after it has been cut with the trowel.
- 5. On the day following the grouting and burlap rubbing, the concrete surface shall again be rubbed clean with a dry burlap to remove inadvertent dust. If any built-up film remains on the parent surface, it shall be removed by being rubbed with a fine abrasive stone without breaking through the surface film of the original concrete. Such rubbing shall be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of the concrete. Following the final rubbing with burlap or abrasive stone, the surface shall be thoroughly washed with stiff bristle brushes (worked only along parallel lines) to remove extraneous materials from the surface. The surface shall then be sprayed with a fine fog spray to maintain a continually damp condition for at least three (3) days after application of the grout.
- 6. When the burlap-rubbed finish has been completed, the concrete surface shall be smooth, free from discolorations and stains, and of uniformly good appearance.

# 3.13 HOT WEATHER CONDITIONS

A. Placing of concrete under conditions of high temperature, low humidity or wind shall be done in accordance with the American Concrete Institute "Hot Weather Conditions" (latest edition).

# 3.14 COLD WEATHER CONDITIONS

A. Cold weather concreting procedures precautions shall conform with American Concrete Institute "Cold Weather Concreting" (latest edition).

#### **SECTION 09905**

#### PAINTING AND PROTECTIVE COATINGS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. High performance industrial coatings (HPIC).
  - 2. Any other coating, thinner, accelerator, inhibitor, etc., specified or required as part of a complete System specified in this Specification Section.
  - 3. Minimum surface preparation requirements.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Division 00 Bidding Requirements, Contract Forms, and Conditions of the Contract.
  - 2. Division 01 General Requirements.
  - 3. Section 03348 Concrete Finishing and Repair of Surface Defects.
  - 4. Section 04220 Concrete Masonry.
  - 5. Section 05505 Metal Fabrications.
  - 6. Section 10400 Identification Devices.
  - 7. Section 11005 Equipment: Basic Requirements.

#### 1.2 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. ASTM International (ASTM):
    - a. D4258, Standard Practice for Surface Cleaning Concrete for Coating.
    - b. D4259, Standard Practice for Abrading Concrete.
    - c. D4261, Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating.
    - d. D4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
    - e. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
    - f. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. {NACE International (NACE).}
  - 3. National Bureau of Standards (NBS):
    - a. Certified Coating Thickness Calibration Standards.
  - 4. National Fire Protection Association (NFPA):
    - a. 101, Life Safety Code.
  - 5. NSF International (NSF).
  - 6. The Society for Protective Coatings (SSPC):
    - a. PA 2, Measurement of Dry Coating Thickness with Magnetic Gages.
    - b. SP 1, Solvent Cleaning.
    - c. SP 2, Hand Tool Cleaning.
    - d. SP 3, Power Tool Cleaning.
    - e. SP 16, Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals.
  - 7. The Society for Protective Coatings/NACE International (SSPC/NACE):
    - a. SP 5/NACE No. 1, White Metal Blast Cleaning.
    - b. SP 6/NACE No. 3, Commercial Blast Cleaning.
    - c. SP 7/NACE No. 4, Brush-off Blast Cleaning.
    - d. SP 10/NACE No. 2, Near-White Blast Cleaning.
    - e. SP 12/NACE No. 5, Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Jetting Prior to Recoating.
    - f. SP 13/NACE No. 6, Surface Preparation of Concrete.
- B. Qualifications:

- Coating manufacturer's authorized representative shall provide written statement attesting
  that applicator has been instructed on proper preparation, mixing and application procedures
  for coatings specified.
- 2. Applicators shall have minimum of 10 years experience in application of similar products on similar project.
  - a. Provide references for minimum of three (3) different projects completed in last five (5) years with similar scope of work.
  - b. Include name and address of project, size of project in value (painting) and contact person.
- C. Deviation from specified mil thickness or product type is not allowed without written authorization of Engineer.
- D. Material shall not be thinned unless approved, in writing, by paint manufacturer's authorized representative.

#### 1.3 DEFINITIONS

- A. Installer or Applicator:
  - 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
  - 2. Installer and applicator are synonymous.
- B. Approved Factory Finish: Finish on a product in compliance with the finish specified in the Specification Section where the product is specified or in Specification Section 11005.
- C. Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to condensation, spillage or splash of a corrosive material such as water, wastewater, or chemical solution; or exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range of 5 to 9.
- D. Highly Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to condensation, spillage or splash of a highly corrosive material such as water, wastewater, or chemical solution; or exposure to highly corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range below five (5) or above nine (9).
- E. Exposed Exterior Surface:
  - 1. Surface which is exposed to weather but not necessarily exposed to view as well as surface exposed to view.
  - 2. Exterior surfaces are considered corrosive environment.
    - a. The following areas are considered highly corrosive:
      - 1) All chemical unloading stations and areas within 10 FT-0 IN of containment areas.
      - 2) All chemical unloading station containment areas.
      - 3) All areas within a 6 FT radius of chemical tank vents.
- F. Finished Area: An area that is listed in or has finish called for on Room Finish Schedule or is indicated on Drawings to be painted.
- G. Immersion Surface:
  - 1. Any surface immersed in water or some other liquid.
  - 2. Surface of any pipe, valve, or any other component of the piping system subject to condensation including the pipe support system.
- H. Paint includes the following:
  - 1. High performance industrial coatings (HPIC) include: Epoxies, urethanes, vinyl ester, waterborne vinyl acrylic emulsions, acrylates, silicones, alkyds, acrylic emulsions and any other coating listed as a HPIC.
- I. Surface Hidden from View: Surfaces such as those within pipe chases, surfaces between top side of ceilings (including drop-in tile ceilings) and underside of floor or roof structures above, surfaces under overhanging walkways if over five feet above adjacent walking surfaces

- J. HPIC: High performance industrial coatings.
- K. SC: Special coatings.

#### 1.4 SUBMITTALS

- A. Shop Drawings:
  - 1. See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
  - 2. Applicator experience qualifications.
    - a. No submittal information will be reviewed until Engineer has received and approved applicator qualifications.
  - 3. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's application instructions.
    - c. Manufacturer's surface preparation instructions.
    - d. If products being used are manufactured by Company other than listed {in the MATERIALS Article of this Specification Section}, provide complete individual data sheet comparison of proposed products with specified products including application procedure, coverage rates and verification that product is designed for intended use.
    - e. Contractor's written plan of action for containing airborne particles created by blasting operation and location of disposal of spent contaminated blasting media.
    - f. Coating manufacturer's recommendation on abrasive blasting.
    - g. Manufacturer's recommendation for universal barrier coat.
    - Manufacturer's recommendation for providing temporary or supplemental heat or dehumidification or other environmental control measures.
  - 4. Manufacturer's statement regarding applicator instruction on product use.
  - Certification that High Performance Coating Systems proposed for use have been reviewed and approved by Senior Corrosion Specification Specialist employed by the coating manufacturer.

#### B. Samples:

- 1. Manufacturer's full line of colors for Engineer's preliminary color selection.
- 2. After preliminary color selection by Engineer provide two (2) 3 x 5 IN samples of each final color selected.
- C. Informational Submittals:
  - 1. See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
  - 2. Approval of application equipment.
  - 3. Applicator's daily records:
    - a. Submit daily records at end of each week in which painting work is performed unless requested otherwise by Engineer's on-site representative.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver in original containers, labeled as follows:
  - 1. Name or type number of material.
  - 2. Manufacturer's name and item stock number.
  - 3. Contents, by volume, of major constituents.
  - 4. Warning labels.
  - 5. VOC content.

#### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, only the following manufacturers are acceptable:

- 1. High performance industrial coatings:
  - a. Tnemec.
  - b. ICI Devoe.
  - c. Carboline Protective Coatings.
  - d. Sherwin Williams.
  - e. Dampney Company, Inc.
  - f. PPG Industries/Amercoat.
- B. Submit request for substitution in accordance with Specification Section 01640.
  - Product VOC content will be an important factor when determining acceptability of substitution.

#### 2.2 MATERIALS

- A. For unspecified materials such as thinner, provide manufacturer's recommended products.
- B. Paint Systems General:
  - 1. P = prime coat.
  - 2. F1, F2 . . . Fn = first finish coat, second finish coat . . . . nth finish coat, color as selected by Engineer.
  - 3. If two (2) finish coats of same material are required, Contractor may, at his option and by written approval from paint manufacturer, apply one (1) coat equal to mil thickness of two (2) coats specified.
- C. HPIC products listed in the MATERIALS Article, Paint Systems paragraph are manufactured by Tnemec.
  - Products of other listed manufacturers are acceptable for use providing the product is of the same generic resin, requires comparable surface preparation, has comparable application requirements, meets the same VOC levels or better, provides the same finish and color options and will withstand the atmospheric conditions of the location where it is to be applied.
- D. Paint Systems (Systems not shown are not used):
  - HPIC SYSTEM #15 Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy Top Coat.
    - a. Prime coat:
      - 1) P1 = 1 coat, 4 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).
    - b. Finish coat:
      - 1) Interior:
        - a) F1 = 1 coat, 6 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).
        - b) F2 = 1 coat, 6 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).
      - 2)
  - HPIC SYSTEM #36 Epoxy Modified Surfacer/Filler with Polyamine Novolac Epoxy Top Coats.
    - a. Filler/surfacer coat:
      - 1) Filler = 1 coat, 0.0625 IN thick, Series 218 Mortar Clad.
    - b. Prime coat:
      - 1) P1 (horizontal surface) = 1 coat, 10 to 12 mils, Series 282 Tneme-Glaze.
      - 2) P1 (vertical surface) = 1 coat, 6 to 8 mils, Series 282 Tneme-Glaze.
    - c. Finish coat:
      - 1) F1 (horizontal surface) = 1 coat, 10 to 12 mils, Series 282 Tneme-Glaze.
      - 2) F1 (vertical surface) = 1 coat, 6 to 8 mils, Series 282 Theme-Glaze.
  - 3. HPIC SYSTEM #43 Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy Top Coat.
    - a. Prime coat:
      - 1) P1 = 1 coat, 2.5 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).
    - b. Finish coat:
      - 1) Interior:
        - a) F1 = 1 coat, 3 mils, Series L69 Epoxoline (Polyamidoamine Epoxy).

#### PART 3 - EXECUTION

#### 3.1 ITEMS TO BE PAINTED

- A. Exposed Exterior Surfaces including:
  - 1. Piping, valves, fittings and supports.
  - 2. Steel pipe bollards (not galvanized).
  - 3. Structural steel.
  - 4.
- 1) Piping, valves and fitting, and supports.
- 2) Miscellaneous ferrous metal surfaces.

#### 3.2 ITEMS NOT TO BE PAINTED

- A. General: Do not paint items listed in this Article unless specifically noted in the Contract Documents to be painted.
- B. Items with Approved Factory Finish: These items may require repair of damaged painted areas or painting of welded connections.
- C. Electrical Equipment:
  - 1. Do not field paint electrical equipment except where painting is specifically stated elsewhere in these Contract Documents, or where the equipment is subject to a corrosive environment and is specifically noted to be painted.
- D. Other Items:
  - 1. Stainless steel surfaces except:
    - a. Piping where specifically noted to be painted.
    - b. Banding as required to identify piping.
  - 2. Aluminum surfaces except:
    - a. Where specifically shown in the Contract Documents.
    - b. Where in contact with concrete.
    - c. Where in contact with dissimilar metals.
  - 3. Fiberglass surfaces except:
    - a. Fiberglass piping where specifically noted to be painted.
    - o. Piping supports where specifically noted to be painted.
  - 4. Code labels and equipment identification and rating plates.

#### 3.3 SCHEDULE OF ITEMS TO BE PAINTED AND PAINTING SYSTEMS

- A. Pipe, Valves, and Fittings:
  - 1. Bare steel pipe bollards: SYSTEM #2.
- B. Field painting of fusion bonded epoxy coated piping, valves, couplings, etc.: SYSTEM #43.

#### 3.4 PREPARATION

- A. General:
  - 1. Verify that atmosphere in area where painting is to take place is within paint manufacturer's acceptable temperature, humidity and sun exposure limits.
    - Provide temporary heating, shade and/or dehumidification as required to bring area within acceptable limits.
      - 1) Provide temporary dehumidification equipment properly sized to maintain humidity levels required by paint manufacturer.
      - 2) Provide clean heat with heat exchanger type equipment sufficient in size to maintain temperature on a 24 HR basis.
        - a) Vent exhaust gases to exterior environment.
        - b) No exhaust gases shall be allowed to vent into the space being painted or any adjacent space.
  - 2. Prepare surfaces to be painted in accordance with coating manufacturer's instructions and this Specification Section unless noted otherwise in this Specification Section.

- a. Where discrepancy between coating manufacturer's instructions and this Specification Section exists, the more stringent preparation shall be provided unless approved otherwise, in writing, by the Engineer.
- 3. Remove all dust, grease, oil, compounds, dirt and other foreign matter which would prevent bonding of coating to surface.
- 4. Adhere to manufacturer's recoat time surface preparation requirements.
  - a. Surfaces that have exceeded coating manufacturer's published recoat time and/or have exhibited surface chalking shall be prepared prior to additional coating in accordance with manufacturer's published recommendations.
    - 1) Minimum SSPC SP 7/NACE No. 4 unless otherwise approved by Engineer.

#### B. Protection:

- 1. Protect surrounding surfaces not to be coated.
- 2. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.
- C. Prepare and paint before assembly all surfaces which are inaccessible after assembly.

#### D. Ferrous Metal:

- Prepare ductile iron pipe in accordance with pipe manufacturer's recommendations and NAPF.
  - a. All piping, pumps, valves, fittings and any other component used in any water piping system that requires preparation for painting shall be prepared in accordance with requirements for immersion service.
    - 1) Pipe: NAPF 500-03-04.
    - 2) Fittings: NAPF 500-03-05
  - Prepare all areas requiring patch painting in accordance with recommendations of manufacturer and NAPF.
  - Remove bituminous coating per piping manufacturer, paint manufacturer and NAPF recommendations.
    - 1) The most stringent recommendations shall apply.
- 2. Complete fabrication, welding or burning before beginning surface preparation.
  - a. Chip or grind off flux, spatter, slag or other laminations left from welding.
  - b. Remove mill scale.
  - c. Grind smooth rough welds and other sharp projections.
- Solvent clean in accordance with SSPC SP 1 or detergent and low-pressure water clean in accordance with SSPC SP 12/NACE No. 5 all surfaces scheduled to receive additional SSPC surface preparation.
- 4. Surfaces subject to corrosive or highly corrosive environment and all surfaces subject to immersion service:
  - a. Near-white blast clean in accordance with SSPC SP 10/NACE No. 2.
- All interior and exterior structural steel not included in corrosive, highly corrosive or immersion service surfaces:
  - . Minimum commercial blast clean in accordance with SSPC SP 6/NACE No. 3.
- 6. Surfaces subject to high temperatures.
  - a. Heat in excess of 600 DegF: SSPC SP 10/NACE No. 2.
  - b. Heat in excess of 200 DegF but less than 600 DegF: SSPC SP 6/NACE No. 3.
- 7. Surfaces of steel joists and steel trusses:
  - a. Commercial blast clean the major portion of the truss in accordance with SSPC SP 6/NACE No. 3.
  - b. Power tool or hand tool clean tight connection areas and other difficult to access areas in accordance with SSPC SP 2 or SSPC SP 3.
- 8. Steel surfaces scheduled to receive SYSTEM #24 or #35:
  - a. White metal blast clean in accordance with SSPC SP 5/NACE No. 1.
  - b. Provide 2-1/2 to 3 mil anchor profile for SYSTEMS #24 and #35.
- 9. All fusion bonded epoxy coated surfaces identified to be field painted:
  - a. Remove all traces of gloss finish by sanding or by abrasive brush blasting.

- b. Clean surface after removing gloss finish to remove sanding or blasting residue.
- 10. Restore surface of field welds and adjacent areas to original surface preparation.
- 11. Black iron piping: Remove surface varnish by solvent or waterjet and detergent cleaning or brush-off blast cleaning in accordance with SSPC SP 7/NACE No. 4.

#### E. Preparation by Abrasive Blasting:

- 1. All abrasive-blasted ferrous metal surfaces shall be inspected {and approved in writing by NACE certified coatings inspector} immediately prior to application of paint coatings.
  - a. Inspection shall be performed to determine cleanliness and profile depth of blasted surfaces and to certify that surface has been prepared in accordance with these Specifications.
- 2. Schedule the abrasive blasting operation so blasted surfaces will not be wet after blasting and before painting.
- 3. Perform additional blasting and cleaning as required to achieve surface preparation required.
  - a. Prior to painting, reblast surfaces allowed to set overnight and surfaces that show rust bloom.
  - b. Surfaces allowed to set overnight or surfaces which show rust bloom prior to painting shall be reinspected {and approved by NACE certified coatings inspector} prior to paint application.
- 4. Profile depth of blasted surface: Not less than 1 mil or greater than 2 mils unless required otherwise by coating manufacturer.
- 5. Provide compressed air for blasting that is free of water and oil.
  - a. Provide accessible separators and traps.
- 6. Confine blast abrasives to area being blasted.
  - a. Provide shields of polyethylene sheeting or other such barriers to confine blast material.
  - b. Plug pipes, holes, or openings before blasting and keep plugged until blast operation is complete and residue is removed.
- 7. Protect nameplates, valve stems, rotating equipment, motors and other items that may be damaged from blasting.
- 8. Reblast surfaces not meeting requirements of these Specifications.
- 9. Abrasive blasting media may be recovered, cleaned and reused providing Contractor submits, for Engineer's review, a comprehensive recovery plan outlining all procedures and equipment proposed in reclamation process.
- 10. Properly dispose of blasting material contaminated with debris from blasting operation not scheduled to be reused.
- F. All Plastic Surfaces and Non-Ferrous Surfaces Except Galvanized Steel:
  - 1. Sand using 80-100 grit sandpaper to scarify surfaces.

#### 3.5 APPLICATION

#### A. General:

- Thin, mix and apply coatings by brush, roller, or spray in accordance with manufacturer's installation instructions.
  - Application equipment must be inspected and approved in writing by coating manufacturer.
  - b. Hollow metal shall be spray applied only.
- 2. Temperature and weather conditions:
  - a. Do not paint surfaces when surface temperature is below 50 DegF unless product has been formulated specifically for low temperature application and application is approved in writing by Engineer and paint manufacturer's authorized representative.
  - b. Avoid painting surfaces exposed to hot sun.
  - c. Do not paint on damp surfaces.
- 3. Immediately after surface has been inspected {and accepted by NACE certified coatings inspector}, apply structural steel and miscellaneous steel {and steel joist} {and steel truss} prime coat in the factory.
  - a. Finish coats shall be applied in the {field} {factory}.
  - b. Prime coat referred to here is prime coat as indicated in this Specification.

- 1) Structural steel and miscellaneous steel {and steel joist} {and steel truss} prime coating applied in factory (shop) as part of Fabricator's standard rust inhibiting and protection coating is not acceptable as replacement for specified prime coating.
- 4. Provide complete coverage to mil thickness specified.
  - a. Thickness specified is dry mil thickness.
  - b. All paint systems are "to cover."
    - 1) In situations of discrepancy between manufacturer's square footage coverage rates and mil thickness, mil thickness requirements govern.
  - c. When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.
- If so directed by Engineer, do not apply consecutive coats until Engineer has had an opportunity to observe and approve previous coats.
- 6. Apply materials under adequate illumination.
- 7. Evenly spread to provide full, smooth coverage.
- 8. Work each application of material into corners, crevices, joints, and other difficult to work areas.
- 9. Avoid degradation and contamination of blasted surfaces and avoid intercoat contamination.
  - a. Clean contaminated surfaces before applying next coat.
- 10. Smooth out runs or sags immediately, or remove and recoat entire surface.
- 11. Allow preceding coats to dry before recoating.
  - a. Recoat within time limits specified by coating manufacturer.
  - If recoat time limits have expired re-prepare surface in accordance with coating manufacturer's printed recommendations.
- 12. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
- 13. Coat all aluminum in contact with dissimilar materials.
- 14. When coating rough surfaces which cannot be backrolled sufficiently, hand brush coating to work into all recesses.
- 15. Backroll concrete and masonry {and gypsum board} {and plaster} {and abuse resistant panel} {and wood} surfaces with a roller if paint coatings are spray applied.

#### B. Prime Coat Application:

- 1. Prime all surfaces indicated to be painted.
  - Apply prime coat in accordance with coating manufacturer's written instructions and as written in this Specification Section.
- 2. Ensure field-applied coatings are compatible with factory-applied coatings.
  - a. {Ensure new coatings applied over existing coatings are compatible}.
  - b. Employ services of coating manufacturer's qualified technical representative.
    - 1) Certify through material data sheets.
    - 2) Perform test patch.
  - c. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.
  - d. At Contractor's option, coatings may be removed, surface re-prepared, and new coating applied using appropriate paint system listed in the MATERIALS Article, Paint Systems paragraph of this Specification Section.
    - 1) All damage to surface as result of coating removal shall be repaired to original condition or better by Contractor at no additional cost to Owner.
- 3. Prime ferrous metals embedded in concrete to minimum of 1 IN below exposed surfaces.
- 4. Back prime all wood scheduled to be painted, prior to installation.
- 5. After application of primer to gypsum board surfaces, inspect surface and repair in accordance with the PREPARATION Article of this Specification Section.
  - a. Re-prime repaired surfaces to uniform finish before application of finish coat(s).
- 6. Apply zinc-rich primers while under continuous agitation.
- 7. Ensure abrasive blasting operation does not result in embedment of abrasive particles in paint film.

- 8. Brush or spray bolts, welds, edges and difficult access areas with primer prior to primer application over entire surface.
- 9. Touch up damaged primer coats prior to applying finish coats.
  - a. Restore primed surface equal to surface before damage.
- All surfaces of steel lintels and steel components of concrete lintels used in wall
  construction shall be completely painted with both prime and finish coats prior to placing in
  wall.

#### C. Finish Coat Application:

- Apply finish coats in accordance with coating manufacturer's written instructions and in accordance with this Specification Section; manufacturer instructions take precedent over these Specifications.
- Touch up damaged finish coats using same application method and same material specified for finish coat.
  - a. Prepare damaged area in accordance with the PREPARATION Article of this Specification Section.

#### 3.6 FIELD QUALITY CONTROL

- A. Contractor to provide protection for surfaces painted with epoxy coatings to prevent chalking.
  - 1. Surfaces showing chalking will not be accepted regardless of condition of paint film.
- B. Maintain Daily Records:
  - 1. Record the following information during application of each coat of paint applied:
    - a. Date, starting time, end time, and all breaks taken by painters.
    - b. For exterior painting:
      - 1) Sky condition.
      - 2) Wind speed and direction.
    - c. Air temperature.
    - d. Relative humidity.
    - e. Moisture content and surface temperature of substrate prior to each coat.
    - f. Provisions utilized to maintain work area within manufacturer's recommended application parameters including temporary heating, ventilation, cooling, dehumidification and provisions utilized to mitigate wind blown dust and debris from contaminating the wet paint film.
    - g. Record environmental conditions, substrate moisture content and surface temperature information not less than once every four (4) hours during application.
      - 1) Record hourly when temperatures are below 50 DegF or above 100 DegF.

#### 3.7 CLEANING

- A. Clean paint spattered surfaces.
  - 1. Use care not to damage finished surfaces.
- B. Upon completion of painting, replace hardware, accessories, plates, fixtures, and similar items.

#### **SECTION 15061**

#### **GAS PIPE AND FITTINGS**

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install natural gas piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

#### 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities
- B. Section 015104 Gas Valves and Meters

#### 1.3 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Society of Mechanical Engineers (ASME):
    - a. B1.2, Gages and Gaging for Unified Inch Screw Threads
    - b. B16.5, Pipe Flanges and Flanged Fittings
    - c. B16.9, Factory-Made Wrought Steel Butt-Welding Fittings
    - d. B16.11, Forged Steel Fittings, Socket Welding and Threaded
    - e. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges
    - f. B31.8, Gas Transmission and Distribution Piping Systems
    - g. Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators
  - 2. American Petroleum Institute (API)
    - a. 5L, Specification for Line Pipe
    - b. 1104, Standard for Welding of Pipelines and Related Facilities
  - 49 CFR Part 192 Transportation of Natural and Other Gas By Pipeline: Minimum Federal Safety Standards
  - 4. ASTM International (ASTM):
    - a. A193, Standard for Alloy-Steel for High Pressure Service and Other Special Purpose Applications
    - A194, Standard for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
    - A234, Standard Specification for Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
  - 5. American Water Works Association (AWWA):
    - a. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
  - 6. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS)
    - a. SP-83, Class 3000 Steel Pipe Unions Socket Welding and Threaded
    - b. SP-95, Swage(d) Nipples and Bull Plugs
    - c. SP-97, Integrally Reinforced Forged Branch Outlet Fittings Socket Welding, Threaded, and Buttwelding Ends

#### B. Qualifications:

1. Use only certified welders meeting procedures and performance outlined in section 6 of API 1104 or ASME Section IX, and other codes and requirements per local building and utility requirements.

#### PART 2 - PRODUCTS

#### CARBON STEEL PIPE AND FITTINGS

- A. Carbon steel pipe shall conform to ASME B31.8, 49CFR Part 192, and API5L Specification for line pipe. The pipe shall conform to pressure class 300 minimum unless noted otherwise. All fittings and joints should be capable of accommodating pressure of not less than 450psi.
- B. Underground pipe and fittings shall be fusion bond epoxy coated. The exterior of pipe and fittings shall be cleaned and receive a factory applied coating of fusion bonded epoxy resin. Epoxy coating shall conform to AWWA C213. Joints may be field epoxy coated as specified in AWWA C213.
- C. Above ground pipe and fittings shall be painted per Section 09905.
- D. All steel pipe shall be supplied with mill test reports and shall have markings when received which include as a minimum the purchase order number and all markings required by the manufacturing specification.
- E. All pipe larger then 2-inch diameter shall be joined by butt-welding joints. Pipes 2-inch and smaller may be threaded or butt-welded, or socket-welded. Unless specified otherwise, threaded joints and connections and flanged joints and connections are restricted to above ground piping.
- F. All butt-weld Fittings shall be carbon steel and shall conform to ANSI B16.9 and ASTM A234, Gr WPB, latest editions. All threaded and socket weld fittings shall conform to ANSI B16.11, latest edition.
- G. Elbows may be trimmed for odd angle changes in direction if needed. Miter bends shall not be used.
- H. Unions shall conform to Class 3000 MSS SP-83.
- Mueller bypass fittings shall conform to ASME B31.8
- Weld-o-lets shall conform to Class 3000 MSS SP-97
- K. Swaged nipples and bull plugs shall be schedule 80 and conform to ASTM A234, Grade WPB, MSS SP-95.
- L. All flanges shall have a bore equal to the internal diameter of the pipe or fitting to which it will be welded and a pressure class equal to or greater than the design pressure of 450psi.
- M. If a flange is to be welded to pipe or a component whose required yield strength is calculated to be 35,000 psig or less based on its actual nominal wall thickness, the flange shall conform to the latest DOT referenced edition of ANSI B16.5, material group 1.1.
- N. Flange gaskets shall conform to ANSI B16.21 and B16.5. Gaskets shall be metallic spiralwound. Gaskets containing asbestos should not be utilized.

#### PART 3 - EXECUTION

#### INSTALLATION

- A. In general, gas piping shall be laid with a minimum cover of 48 inches, except as otherwise indicated on the drawings.
- B. All pipe shall be laid in accordance with ASME B31.8 with ends abutting and true to the lines and grades indicated on the plans. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
- C. Joining Methods Flanges:
  - 1. Joining method:
    - a. Leave 1/8 to 3/8 IN of flange bolts projecting beyond face of nut after tightening.

- b. Coordinate dimensions and drillings of flanges with flanges for valves, pumps, equipment, tank, and other interconnecting piping systems.
- c. When bolting flange joints, exercise extreme care to assure that there is no restraint on opposite end of pipe or fitting which would prevent uniform gasket compression or cause unnecessary stress, bending or torsional strains being applied to cast flanges or flanged fittings.
  - Allow one (1) flange free movement in any direction while bolts are being tightened.
- d. Do not assemble adjoining flexible coupled, mechanical coupled or welded joints until flanged joints in piping system have been tightened.
- e. Gradually tighten flange bolts uniformly to permit even gasket compression.
- f. Do not overstress bolts to compensate for poor installation.

#### D. Joining Method - Welded Joints:

- 1. Perform welding in accordance with API 1104, or ASME Section IX.
- 2. Weldolets may be used for 2 IN and smaller pipe. All slag shall be removed from inside the pipe.
- E. Joining Method Threaded and Coupled (T/C):
  - 1. Provide T/C end conditions that meet ASME B1.2 requirements.
  - 2. Furnish pipe with factory-made T/C ends.
  - 3. Field cut additional threads full and clean with sharp dies.
  - 4. Leave not more than three (3) pipe threads exposed at each branch connection.
  - 5. Ream ends of pipe after threading and before assembly to remove burrs.
  - Use Teflon thread tape on male thread in mating joints. When using Teflon tape upstream of components such as regulators and meters, the tape wrap should be started past the second thread.
- F. Joining Method Flange Joints and Connections
  - 1. Studs and bolts shall be alloy steel conforming to ASTM A 193, Gr B7; hex nuts shall conform to ASTM A 194, Gr 2H.
  - 2. Use a clean, properly sized gasket of the proper material for the type of flange face to be joined. Install the gasket in strict accordance with manufacturer's instructions using no foreign substance such as cement, lubricant or sealant unless specifically allowed by the manufacturer. It is important to center the gasket on the flange face.
  - 3. The condition of threads on all studs, bolts and nuts should be such that the nuts can be finger tightened. Bolts, studs or nuts, which have deformed threads or burrs which may affect proper tightening or which show evidence of cracks shall not be used.

#### 3.2 TESTING OF GAS PIPE

- A. Test the gas mains and service lines after construction and before being placed in service. Follow all testing recommendations and safety precautions as recommended by ASME B31.8, and 49 CFR Part 192.
  - 1. Test Medium: water
  - 2. Test Pressure: 675 psi
  - 3. Test Duration: 24 hrs
- B. At no time shall the test pressure exceed 100 percent of the pipe's rated working pressure. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period.
- C. Allowable leakage rates:
  - 1. All natural gas systems (all exposed piping systems, all pressure piping systems and all buried systems) which are hydrostatically pressure tested shall have zero leakage at the specified test pressure throughout the duration of the test.

- D. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to the Owner. Contractor shall furnish, drain, and dispose of hydrotest water.
- E. All joints, including welds, are to be left exposed for examination during the test. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.
- F. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.
- G. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.
- H. For fabricated units and short sections of pipe to be installed for which a post installation test is impractical, a pre-installation test of eight (8) hours duration may be used provided all of the piping is visible and is checked for leaks periodically during the test.
- After test is completed, all piping shall be drained and purged with air for drying to a dew point of -40degF.

#### 3.3 FIELD QUALITY CONTROL

- A. All visual and non-destructive testing of field welds shall be in accordance with API 1104.
- B. An independent third party shall complete radiographic testing of all pipeline welds.

#### **END OF SECTION**

#### **SECTION 15090**

#### PIPE SUPPORT SYSTEMS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Pipe support and anchor systems.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 09905 Painting and Protective Coatings.

#### 1.2 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Society of Mechanical Engineers (ASME):
    - a. B31.1, Power Piping.
    - b. B31.3, Process Piping.
  - 2. ASTM International (ASTM):
    - a. A36, Standard Specification for Carbon Structural Steel.
    - A510, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
    - c. A575, Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
    - d. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
  - 3. American Welding Society (AWS):
    - a. D1.1, Structural Welding Code Steel.
  - . Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):
    - a. SP-58, Pipe Hangers and Supports Materials, Design and Manufacture.
    - b. SP-69, Pipe Hangers and Supports Selection and Application.

#### 1.3 SUBMITTALS

- A. Shop Drawings:
  - See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
  - 2. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's installation instructions.
    - c. Itemized list of wall sleeves, anchors, support devices and all other items related to pipe support system.
    - d. Scale drawings showing guides, hangers, supports, anchors, structural members and appurtenances to describe the pipe support system.

#### 1.4 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.
- B. Submit request for substitution in accordance with Specification Section 01640.

#### 1.5 MANUFACTURED UNITS

- A. Hanger Rods:
  - 1. Material:
    - a. ASTM A36.
    - b. {ASTM A510, Grade 1020.}
    - c. ASTM A575, Grade M1020.
    - d. ASTM A576, Grade 1020.

- e. Minimum allowable tensile stress of 12,000 psi at 650 DegF per MSS SP-58.
- 2. Continuously threaded.
- 3. Electro-galvanized or cadmium plated after threads are cut.
- 4. Load limit:

NOMINAL ROD DIAMETER	MAXIMUM SAFE LOAD, (LBS)
3/8 IN DIA (min)	610
1/2 IN DIA	1,130
5/8 IN DIA	1,810
3/4 IN DIA	2,710
7/8 IN DIA	3,770
1 IN DIA	4,960

#### B. Hangers:

- 1. Hangers for use directly on copper pipe: Copper or cadmium plated.
- 2. Hangers for use other than directly on copper pipe: Cadmium plated or galvanized.
- 3. Hanger type schedule:

APPLICATION	PIPE SIZE	HANGER TYPE
All except noted	4 IN and less	ANVIL Figure 108 with Figure 114
All except noted	Over 4 IN	ANVIL Figure 590
Steam, condensate and hot water	All	ANVIL Figure 181, Figure 82

- C. Concrete Inserts for Hanger Rods:
  - 1. Continuous slots: Unistrut #P1000.
  - 2. Individual inserts: ANVIL Figure 281.
  - 3. Self-drilling expansion anchors: Phillips flush-end or snap-off end type.
- D. Beam Clamps for Hanger Rods:
  - 1. {Standard} {Heavy} duty.
  - 2. ANVIL Figure {133} {134}.
- E. Trapeze Hangers for Suspended Piping:
  - 1. Material: Steel.
  - 2. Galvanized.
  - 3. Angles, channels, or other structural shapes.
  - 4. Curved roller surfaces at support point corresponding with type of hanger required.
- F. Vertical Pipe Supports:
  - 1. At base of riser.
  - 2. Lateral movement:
    - a. Clamps or brackets:
- G. Expanding Pipe Supports:
  - 1. Spring hanger type.
  - 2. MSS SP-58.
- H. Pipe Support Saddle:
  - 1. For pipe located 3 FT or less from floor elevation, except as otherwise indicated on Drawings.
  - 2. ANVIL Figure 264.
- I. Pipe Support Risers:
  - 1. Schedule 40 pipe.
  - 2. Galvanized.
  - 3. As recommended by saddle manufacturer.
- J. Pipe Support Base Plate:

- 1. 4 IN larger than support.
- 2. Collar 3/16 IN thickness, circular in shape, and sleeve type connection to pipe.
- 3. Collar fitted over outside of support pipe and extended 2 IN from floor plate.
- 4. Collar welded to floor plate.
- 5. Edges ground smooth.
- 6. Assembly hot-dipped galvanized after fabrication.
- K. Pipe Covering Protection Saddle:
  - 1. For insulated pipe at point of support.
  - 2. ANVIL Figure 167, Type B.
- L. Pipe Anchors:
  - 1. For locations shown on the Drawings.
  - 2. 1/4 IN steel plate construction.
  - 3. Hot-dipped galvanized after fabrication.
  - 4. Designed to prevent movement of pipe at point of attachment.
- M. Pipe Guides:
  - 1. For locations on both sides on each expansion joint or loop.
  - 2. To ensure proper alignment of expanding or contracting pipe.
  - 3. ANVIL Figure 256.

#### 1.6 DESIGN REQUIREMENTS

- A. Supports capable of supporting the pipe for all service and testing conditions.
  - 1. Provide 5 to 1 safety factor.
- B. Allow free expansion and contraction of the piping to prevent excessive stress resulting from service and testing conditions or from weight transferred from the piping or attached equipment.
- C. Design supports and hangers to allow for proper pitch of pipes.
- D. For chemical and waste piping, design, materials of construction and installation of pipe hangers, supports, guides, restraints, and anchors:
  - 1. ASME B31.3.
  - 2. MSS SP-58 and MSS SP-69.
  - 3. Except where modified by this Specification.
- E. For steam and hot and cold water piping, design, materials of construction and installation of pipe hangers, supports, guides, restraints, and anchors:
  - 1. ASME B31.1.
  - 2. MSS SP-58 and MSS SP-69.
- F. Check all physical clearances between piping, support system and structure.
  - 1. Provide for vertical adjustment after erection.
- G. Support vertical pipe runs in pipe chases at base of riser.
  - 1. Support pipes for lateral movement with clamps or brackets.
- H. Place hangers on outside of pipe insulation.
  - 1. Use a pipe covering protection saddle for insulated pipe at support point.
  - 2. Insulated piping 1-1/2 IN and less: Provide a 9 IN length of 9 LB density fiberglass insulation at saddle.
  - 3. Insulated piping over 1-1/2 IN: Provide a 12 IN length of 9 LB density fiberglass insulation on saddle.
- Provide 20 GA galvanized steel pipe saddle for fiberglass and plastic support points to ensure minimum contact width of 4 IN.
- J. Pipe Support Spacing:
  - 1. General:
    - Factor loads by specific weight of liquid conveyed if specific weight is greater than water.

- b. Locate pipe supports at maximum spacing scheduled unless indicated otherwise on the Drawings.
- c. Provide at least one (1) support for each length of pipe at each change of direction and at each valve.
- 2. Steel, stainless steel, cast-iron pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
1-1/2 and less	5
2 thru 4	10
5 thru 8	15
10 and greater	20

3. Copper pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
2-1/2 and less	5
3 thru 6	10
8 and greater	15

#### **PART 2 - EXECUTION**

#### 2.1 INSTALLATION

- A. Provide piping systems exhibiting pulsation, vibration, swaying, or impact with suitable constraints to correct the condition.
  - 1. Included in this requirement are movements from:
    - a. Trap discharge.
    - b. Water hammer.
    - c. Similar internal forces.
- B. Weld Supports:
  - 1. AWS D1.1.
  - 2. Weld anchors to pipe in accordance with ASME B31.3.
- C. Locate piping and pipe supports as to not interfere with open accesses, walkways, platforms, and with maintenance or disassembly of equipment.
- D. Inspect hangers for:
  - 1. Adequacy of clearance for piping and supports in the hot and cold positions.
  - 2. Guides to permit movement without binding.
  - 3. Adequacy of anchors.
- E. Inspect hangers after erection of piping systems and prior to pipe testing and flushing.
- F. Install individual or continuous slot concrete inserts for use with hangers for piping and equipment.
  - 1. Install concrete inserts as concrete forms are installed.
- G. Welding:
  - 1. Welding rods: ASTM and AWS standards.
  - 2. Integral attachments:
    - a. Include welded-on ears, shoes, plates and angle clips.
    - b. Ensure material for integral attachments is of good weldable quality.
  - 3. Preheating, welding and postheat treating: ASME B31.3, Chapter V.
- H. Field Painting:
  - 1. Comply with Specification Section 09905.

#### **END OF SECTION**

#### **SECTION 15100**

#### VALVES: BASIC REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Valving, actuators, and valving appurtenances.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 09905 Painting and Protective Coatings.
  - 2. Section 11005 Equipment: Basic Requirements.
  - 3. Section 15060 Pipe and Pipe Fittings: Basic Requirements.

#### 1.2 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Society of Mechanical Engineers (ASME):
    - a. B1.20.1, Pipe Threads, General Purpose.
    - b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
    - c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - 2. ASTM International (ASTM):
    - A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
    - b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
    - c. D638, Standard Test Method for Tensile Properties of Plastics.
    - D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
    - e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.
    - f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
  - 3. American Water Works Association (AWWA):
    - a. C207, Standard for Steel Pipe Flanges for Waterworks Service Sizes 4 IN through 144 IN.
    - b. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.
    - c. C504, Standard for Rubber-Seated Butterfly Valves.
    - d. C507, Standard for Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).
    - e. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
    - f. {C541, Standard for Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.}
    - g. {C542, Standard for Electric Motor Actuators for Valves and Slide Gates.}
    - h. C550, Standard for Protective Coatings for Valves and Hydrants.
    - i. C606, Standard for Grooved and Shouldered Joints.
  - American Water Works Association/American National Standards Institute (AWWA/ANSI):
    - a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 5. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    - b. MG 1, Motors and Generators.

#### 1.3 DEFINITIONS

- A. The following are definitions of abbreviations used in this Specification Section or one (1) of the individual valve sections:
  - 1. CWP: Cold water working pressure.

- 2. SWP: Steam working pressure.
- 3. WOG: Water, oil, gas working pressure.
- 4. WWP: Water working pressure.

#### 1.4 SUBMITTALS

- A. Shop Drawings:
  - 1. See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
  - 2. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's installation instructions.
    - c. Valve pressure and temperature rating.
    - d. Valve material of construction.
    - e. Special linings.
    - f. Valve dimensions and weight.
    - g. Valve flow coefficient.
    - h. Wiring and control diagrams for electric or cylinder actuators.
  - 3. Test reports.
- B. Operation and Maintenance Manuals:
  - 1. See Specification Section 01342 for requirements for:
    - a. The mechanics and administration of the submittal process.
    - b. The content of Operation and Maintenance Manuals.
- C. Informational Submittals:
  - 1. Verification from valve actuator manufacturer that actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted, and that the valve actuator responds correctly to the valve position command.

#### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

#### 2.2 MATERIALS

A. Refer to individual valve Specification Sections.

#### 2.3 VALVE ACTUATORS

- A. Valve Actuators General:
  - 1. Provide actuators as shown on Drawings or specified.
  - 2. Counter clockwise opening as viewed from the top.
  - 3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.
  - 4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.
  - 5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.
  - 6. Extension stem:
    - a. Install where shown or specified.
    - Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft
    - c. Pin all stem connections.
    - d. Center in valve box or grating opening band with guide bushing.
- B. Buried Valve Actuators:

- 1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load.
- 2. Box base to enclose buried valve gear box or bonnet.
- 3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.
- 4. Provide at least two (2) tee handle keys for actuator nuts, with 5 FT extension between key and handle.
- 5. Extension stem:
  - a. Provide for buried valves greater than 4 FT below finish grade.
  - b. Extend to within 6 IN of finish grade.
- Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.

#### C. Plastic Valve Vault:

- 1. Provide in non-traffic areas only on valve applications 3-1/2 IN and less.
- 2. Nominal 7-1/2 IN DIA top section.
- 3. Design unit for screw type extension section having nominal 9 IN DIA bell.
- 4. Cast iron ring and lid.
- Constructed of injection molded polyolefin compound with fibrous inorganic component reinforcing and UV stabilization.
- 6. Armor Access Boxes.

#### D. Exposed Valve Manual Actuators:

- 1. Provide for all exposed valves not having electric or cylinder actuators.
- 2. Provide handwheels for gate and globe valves.
  - a. Size handwheels for valves in accordance with AWWA C500.
- Provide lever actuators for plug valves, butterfly valves and ball valves 3 IN DIA and smaller.
  - a. Lever actuators for butterfly valves shall have a minimum of 5 intermediate lock positions between full open and full close.
  - b. Provide at least two (2) levers for each type and size of valve furnished.
- 4. Gear actuators required for plug valves, butterfly valves, and ball valves 4 IN DIA and larger.
- 5. Provide gearing for gate valves 20 IN and larger in accordance with AWWA C500.
- 6. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.
- 7. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.
  - a. Cadmium-plated chain looped to within 3 FT of finish floor.
  - b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.
- 8. Provide cast iron floor stands where shown on Drawings.
  - a. Stands to be furnished by valve manufacturer with actuator.
  - Stands or actuator to include thrust bearings for valve operation and weight of accessories.

#### E. Submerged Actuators:

- 1. Mount the valve actuator on top of an extension bonnet 3 FT above any adjacent personnel access.
- 2. The valve and bonnet connection shall be flanged and watertight.
- 3. Provide a top brace support for the bonnet.
  - a. Mount the brace 6 IN below the top of the wall as shown.
- 4. Materials:
  - a. Extension bonnet: Cast iron ASTM A126 or steel.
  - b. Brace and anchor bolts: Type 304 stainless steel.
- 5. Handwheel:
  - a. Permanently attached for manual operation.
  - b. Positive declutch mechanism to engage and disengage handwheel.
  - c. Handwheel shall not rotate during motor operation.
  - d. Inoperable motor shall not prevent manual operation.

- Limit torque and thrust loads in both closing and opening directions by torque limit switches.
  - a. Provide torque switches with micrometer adjustment and reference setting indicator.
    - 1) Assure adjustment variation of approximately 40 percent in torque setting.
  - b. Provide switches having rating of not less than 6 A at 120 Vac and 2.2 A at 115 Vdc.
  - c. Limit and torque switches shall have totally sealed contacts.

#### 2.4 FABRICATION

- A. End Connections:
  - 1. Provide the type of end connections for valves as required in the Piping Schedules presented in Specification Section 15060 or as shown on the Drawings.
  - 2. Comply with the following standards:
    - a. Threaded: ASME B1.20.1.
    - b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.
    - c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.
    - d. Soldered: ASME B16.18.
    - e. Grooved: Rigid joints per Table 5 of AWWA C606.
- B. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.
- C. Nuts, Bolts, and Washers:
  - 1. Wetted or internal to be bronze or stainless steel.
    - a. Exposed to be zinc or cadmium plated.
- D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.
- E. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

#### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Painting Requirements: Comply with Specification Section 09905 for painting and protective coatings.
- C. Setting Buried Valves:
  - 1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.
  - 2. Set valves and valve boxes plumb.
  - 3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.
  - 4. Install in closed position.
  - 5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.
  - 6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.
- D. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.
- E. For grooved coupling valves, install rigid type couplings {or provide separate support to prevent rotation of valve from installed position}.
- F. For threaded valves, provide union on one (1) side within 2 FT of valve to allow valve removal.

G. Install valves accessible for operation, inspection, and maintenance. Specifier: The FIELD QUALITY CONTROL Article is used to define tests and inspections of installed or complete work. Include manufacturer's field services.

**END OF SECTION** 

#### **SECTION 15104**

#### **BALL VALVES AND METERS**

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install valves and meters together with all appurtenances as shown and detailed on the Drawings and specified herein.

#### 1.2 RELATED WORK

A. Section 15061 – Gas Pipe and Fittings

#### 1.3 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Gas Association (AGA)
    - a. ANSI B109.1, Diaphragm Type Gas Displacement Meters (Under 500 cubic feet per hour capacity)
    - ANSI B109.2, Diaphragm Type Gas Displacement Meters (500 cubic feet per hour capacity and over)
  - 2. American Society of Mechanical Engineers (ASME):
    - a. B16.34, Valves Flanged, Threaded, and Welding End
    - b. B31.8, Gas Transmission and Distribution Piping Systems
    - c. B40.100, Pressure Gauges and Gauge Attachments
  - 3. American Petroleum Institute (API)
    - a. 6D, Specification for Pipeline Valves
  - 4. National Fire Protection Association (NFPA)
    - a. 54, National Fuel Gas Code

#### 1.4 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer two (2) copies of an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of the latest revision of the applicable API 6D and ASME B16.34 Standard, and that all tests specified therein have been performed and that all test requirements have been met.

#### PART 2 - PRODUCTS

#### 2.1 BALL VALVES

- A. All steel ball valves 2 inches and smaller shall comply with ASME B16.34 and be provided with threaded ends with wrench operators. All steel ball valves larger than 2 inches shall comply with API 6D and be provided with flanges ends, Class 300 with handwheel or wrench operator.
- B. All ball valves shall be installed above grade.

#### 2.2 PRESSURE REGULATORS

A. All pressure regulators shall have ferrous bodied pressure regulators for individual service lines as indicated on the drawings, capable of reducing line pressure to pressures required for users. Provide regulators with an internal relief function set at a lower pressure than would cause an unsafe operation of any connected user. B. All pressure regulators shall have a single port with orifice diameter no greater then that recommended by the manufacturer for the maximum gas pressure at the regulator inlet. Provide regulator valve vent of resilient materials designed to withstand flow conditions when pressed against the valve port, capable of regulating downstream pressure within limits of accuracy and limiting the buildup of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions. Pressure regulators shall be self contained service regulators, and pipe not exceeding 2 inch diameter.

#### 2.3 METERS

A. All meters shall comply with applicable AGA ANSI B109.1, and AGA ANSI B109.2, and Standard. Meters shall be diaphragm type conforming to NFPA 54. Provide pressure gauges and attachments conforming to ASME B40.100. Provide meters suitable for accurately measuring and handling gas at pressure, temperatures, and flow rates required for the user.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Valves, pressure regulators, and meters shall be installed as nearly as possible in the positions indicated on the Drawings consistent with conveniences of operating the handwheel or wrench. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.
- C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense.
- D. Valves shall not be installed with stems below the horizontal.
- E. Valves shall be set plumb and supported adequately in conformance with the instructions of the manufacturer.
- F. Meters shall be installed in accordance with ASME B31.8 and manufacturer's recommendations. Install permanent gas meters with provisions for isolation and removal for calibration and maintenance, and suitable for operation in conjunction with an energy monitoring and control system.

#### 3.2 PAINTING

- A. Valves and regulators shall be factory primed and fully coated, inside and out, in accordance with manufacturer requirements.
- B. Meters shall be prepared per manufacturers requirements.

#### **END OF SECTION**

### **Standard Water Bid Item Descriptions**

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

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

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

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

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

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

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

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

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

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

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

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

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

W FIRE HYDRANT ASSEMBLY Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings compete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

W FLUSHING ASSEMBLY This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the

flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

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

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

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

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

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

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

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

This item shall be paid EACH (EA) when complete.

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

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

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

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

W PRESSURE REDUCING VALVE This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the

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

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

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

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

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

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

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

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

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

W TAPPING SLEVE AND VALVE SIZE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with

the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

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

Size 2 = All live tapped main sizes greater than 8 inches

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

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

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

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

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

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

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

# TECHNICAL SPECIFICATIONS for US 42 WATERLINE RELOCATION Carroll County Water District

February 2016

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## TECHNICAL SPECIFICATIONS US 42 WATERLINE RELOCATION CARROLL COUNTY WATER DISTRICT

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# SUMMARY OF WORK

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. Relocation of approximately 7,027 lineal feet of water mains and appurtenances in Carroll County, Kentucky.
- B. The Contractor shall provide all materials, labor and equipment necessary for completion of the Project. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the Project shall be included.
- C. Continuous Operations: The existing system must be maintained in continuous operation in such a manner that it meets all local, state, and federal requirements. The Contractor is responsible not to deactivate, demolish, or interfere with any system component required for the continuous operation until a new or temporary permanent-like system has been installed and is operational. The Contractor is responsible for payment of all fines resulting from any action or inaction on his part or the part of his subcontractors during performance of the Work that causes the facility/facilities to operate in an illegal manner or fail to operate in a legal manner.
- D. The construction of the following major Work items are included in the Contract:
  - 1. 6,267 lineal feet of 8-inch SDR 17 PVC water main pipe
  - 2. 760 lineal feet of 8-inch SDR 17 restrained joint PVC water main pipe
  - 3. 858 lineal feet of 12-inch PVC casing pipe, open cut
  - 4. Six (6) water main tie-ins to existing water main
  - 5. Five (5) gate valves
  - 6. Four (4) air release valves
  - 7. Four (4) fire hydrant assemblies
  - 8. Seven (7) water meter relocations
  - 9. Nine (9) water service connections

# 1.2 PERMITS

A. The Contractor shall obtain any permits related to or required by, the Work in this Contract.

# 1.3 CODES

A. Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations and similar communications, to the Owner.

### 1.4 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which a portion must remain functional. The Contractor must maintain the required items and/or systems functional without additional effort by the Owner's personnel and at no extra costs to the Owner.
- B. The Contractor is responsible for verifying all existing conditions, elevations, dimensions, etc., and providing his finished work to facilitate existing conditions.

# **WORK SEQUENCE**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. The Contractor shall conform to all miscellaneous requirements as contained in the Contract.
- B. The Contractor shall perform all Work included in the Contract Documents [Drawings].
- C. The Contractor shall perform all the Work incidental to the items shown in the Contract Documents [Drawings] even though it may not be specifically enumerated.
- D. The Contractor will have to perform the work in a sequence acceptable to the Owner, and in some instances the Work will have to be performed in a sequence directed by the Owner.
- E. Further, the Contractor shall have to perform all the Work included in this project in a sequence that does not cause undue hardships on day-to-day operating personnel.

# 1.2 RELATED REQUIREMENTS

- A. Section 01010 Summary of Work.
- B. Section 01040 Coordination.

# PART 2 - PRODUCTS (NOT APPLICABLE)

# PART 3 - EXECUTION

# 3.1 SCHEDULING THE SEQUENCE OF CONSTRUCTION OPERATIONS

- A. The Contractor shall submit to the Engineer, for review and approval, a complete schedule (progress chart) of his proposed sequence of construction operations prior to commencement of the work.
- B. The Engineer will neither consider nor approve a construction schedule that fails to utilize the entire time allocated by the Contract for the construction of the Project.
- C. The Contractor shall schedule the various construction activities to complete the Project throughout the entire Contract time period. This schedule requirement shall not prevent the Contractor from completing the Project in a shorter time frame than illustrated in the schedule. The construction schedule along with a cost breakdown schedule shall be reviewed and approved by the Owner prior to the submission of the first partial payment request in accordance with the General Conditions.
- D. A copy of the construction schedule shall be submitted to the Owner with each pay request, appropriately marked to indicate the actual progress of the work compared to the planned schedule. This revised schedule must be approved by the Owner prior to payment.

### **SUBMITTALS**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

A. Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

# 1.2 DEFINITIONS

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

# 1.3 CONTRACTOR'S ULTIMATE RESPONSIBILITY

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

# 1.4 GENERAL REQUIREMENTS FOR SUBMITTALS

- A. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Documents. Where applicable, show fabrication, layout, setting and erection details. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus three (3) which will be retained by the Engineer and Owner. Shop drawings shall be folded to an approximate size of 8-1/2 inch x 11 inch and in such manner that the title block will be located in the lower righthand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

- C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. All submittals shall be referenced to the applicable item, section and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s) and shall be accompanied by transmittal forms in the format provided by the Engineer.
- E. The Contractor shall review and check submittals, and indicate his review by initials and date.
- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefor. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.
- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- Submittals for all electrically operated items (including instrumentation and controls) shall
  include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding,
  all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

# 1.5 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers and similar data.
- B. Coordinate each submittal with requirements of Work and Contact Documents.
- C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

# 1.6 SUBMITTAL SCHEDULE

- A. At a minimum the following submittals shall be submitted for review and approval:
  - 1. Work Sequence
  - 2. Tie-In Details
  - 3. PVC Pipe and Fittings
  - 4. PVC Casing Pipe, Spacers and End Seals
  - 5. Service Pipe, Saddle, Corp Stop and Valve Box
  - 6. Waterline Markers
  - 7. Gate Valves
  - 8. Air Release Valves
  - 9. Fire Hydrant Assembly
  - 10. Tracer Wire, and Identification Tape

# SHORING AND BRACING

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Shore and brace sidewalls in excavations with steel sheet piles with wale systems or soldier piles with timber lagging and tie back system as required to protect existing buildings, utilities, roadways, and improvements.
- B. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.
- C. Geotechnical investigation borings, if applicable, were drilled for this project where indicated on the drawings in the report. The geotechnical report was not prepared for purposes of bid development and the accuracy of the report is limited. The Contractor should confer with a geotechnical engineer and/or conduct additional study in the area to obtain the specific type of geotechnical information required for construction and for preparation of bids.

# 1.2 SUBMITTALS

A. Provide copies of information on methods of the shoring and bracing system proposed for the work, design basis, calculations where applicable, and copies of shop drawings for inclusion in the project and job-site record files.

# 1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Shoring and bracing system design shall be prepared and sealed by a registered professional engineer or structural engineer. The system design shall provide the sequence and method of installation and removal. Shoring and bracing system design shall be in accordance with Occupational Safety and Health Administration (OSHA) requirements 29 CFR Section 1926.652.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Steel Sheet Piles: Heavy-gauge steel sheet.
- B. Soldier Piles: Steel H-beams.
- C. Timber Lagging: Heavy timber. Pressure treated with wood preservative for use below water table for extended time period.

# PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install in proper relation with adjacent construction. Coordinate with work of other sections.
- B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

# **ROCK REMOVAL**

# PART 1 - GENERAL

# 1.1 WORK INCLUDED

- A. The Contractor shall excavate rock, if encountered, as required to perform the required work, and shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.
- B. In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid.

# 1.2 REFERENCES

- A. NFPA 495 Code for the Manufacture, Transportation, Storage and use of Explosive Materials.
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

# 1.3 REGULATORY REQUIREMENTS

- A. Conform to Kentucky Department of Mines and Minerals code for explosive disintegration of rock.
- B. Obtain permits from local authorities having jurisdiction before explosives are brought to site or drilling is started.
- C. KRS 351.330
- D. 805 KAR Chapter 4

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Rock definition: Solid mineral material that cannot be removed with a power shovel.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- D. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

# PART 3 - EXECUTION

# 3.1 EXPLOSIVES

- A. The Contractor shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. He shall notify the Engineer, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distance from the explosives. When the need for explosives has ended, all such materials remaining on the Work shall be promptly removed from the premises.
- B. The Contractor shall observe all state, federal and municipal laws, ordinances and regulations relating to the transportation, storage, handling and use of explosives. In the event that any of the above-mentioned laws, ordinances or regulations require a licensed blaster to perform or supervise the Work of blasting, said licensed blaster shall, at all times have his license on the Work and shall permit examination thereof by the Engineer or other officials having jurisdiction.

# 3.2 BLASTING PRECAUTIONS

- A. No explosives shall be used within 20 feet of:
  - 1. Building and/or structures existing, constructed or under construction.
  - 2. Underground and/or overhead utilities whether existing or partially constructed.
- B. Permission for any deviation from the restriction set forth above shall be secured from the Engineer, in writing; however, permission for any such deviations shall not relieve the Contractor from any responsibility in the event of damage to buildings, structures or utilities.
- C. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.
- D. The Contractor shall be solely responsible for his blasting operations. The Contractor shall not hold the Owner and/or the Engineer liable for any damages resulting from his blasting operations on this project.

# 3.3 PREBLAST STRUCTURE SURVEY

- A. Perform a preblast survey to determine and document with pictures the condition of adjacent structures, utilities, wells, buried cables, and other features within a minimum of 400 ft. of the blast area unless otherwise required by applicable regulatory authorities. Determine safe distances to structures or other facilities according to NFPA 495, Appendix B. Where facilities are closer than these distances, and natural barriers are not present, or when the amount of explosive cannot be reduced economically, blasting mats shall be used. Provide mats to protect environmentally sensitive areas, trees within 20 feet from the blasting area, streams, and rock formations from throw rock.
- B. Purpose of survey is to document existing condition of structures prior to blasting, and is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as result of blasting.
- C. Conduct survey prior to start blasting.
- D. Record information for each structure surveyed:
  - 1. Age and type of construction.
  - 2. Location and character of cracks.
  - 3. Evidence of settlement and leakage.
  - 4. Other pertinent information.
- E. Record preblast survey information on forms prepared specifically for preblast surveys.
- F. Supplement written records with photographs or videotape recordings.
- G. Submit copies of written records and photographs or videotapes to respective property owner, as well as, OWNER and ENGINEER, prior to start of blasting.

# 3.4 BLAST DESIGN

- A. Design each blast to avoid damage to existing facilities, adjacent property, and completed Work. Consider effects of blast-induced vibrations and air blast, and fly rock potential in design of each blast.
- B. Whenever peak particle velocity exceeds vibration limits, change design of subsequent blasts, as necessary to reduce peak particle velocity to within limits established by BIC.
- C. Whenever air blast exceeds limits, change design of subsequent blasts or provide controls necessary to reduce air blast to within specified limits.

### 3.5 VIBRATION LIMITS

A. General: Establish appropriate maximum limit for vibration for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to vibration, and federal, state, or local regulatory requirements, but not to exceed 1.25 in/sec.

### 3.6 AIR-BLAST LIMITS

A. Establish appropriate maximum limit for air blast for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to air blast, and federal, state, or local regulatory requirements, but not to exceed 0.015 psi peak overpressure (133 decibels).

# 3.7 FLY ROCK CONTAINMENT

A. Where fly rock may damage existing facilities, adjacent property, or completed Work, cover area to be blasted with blasting mats or provide other means that will contain and prevent scattering of blast debris.

### 3.8 VIBRATION AND AIR-BLAST MONITORING

- A. Monitor and record blast-induced vibrations and air blast using suitable sensors and recording equipment for each blast.
- B. Contractor shall provide two (2) seismographs during blasting operations capable of the following:
  - 1. Designed for monitoring blast-induced vibrations and air blast. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
  - 2. Flat vibration frequency response between 4- and 200-Hz.
  - 3. Capable of recording air-blast overpressure up to 140 decibels.
  - 4. Flat air-blast frequency response between 2- and 500-Hz.
- C. Monitor on, or at, structures or other facilities that are closest to point of blasting. Monitoring more distant facilities that are expected to be sensitive to blast-induced vibrations and air blast.
- D. BIC shall supervise establishment of monitoring programs and initial operation of equipment; review interpretation of records and recommend revisions of blast designs.
- E. Include following information in blasting plan.
  - 1. Vibration and air-blast limits as recommended by BIC.
  - 2. Name of qualified BIC who will be responsible for monitoring program and interpretation of records.
  - 3. Types and models of equipment proposed for monitoring.
  - 4. Numbers and locations of proposed monitoring stations.
  - 5. Procedures to be used for coordinating recording of each blast.
  - 6. Steps to be taken if blasting vibrations or air blast exceed limits.

# 3.9 EXPLOSIVES

A. The CONTRACTOR shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. Notify the OWNER, in advance, of provisions to store and use explosives.

### 3.10 BLASTING PRECAUTIONS

- A. Permission for any deviation from the blasting plan and other specified restrictions shall be secured from the OWNER and applicable authorities, in writing; however, permission for any such deviations shall not relieve the CONTRACTOR from any responsibility in the event of damage to buildings, structures or utilities.
- B. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.

C. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold the OWNER and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

### 3.11 BLASTING RECORDS

- A. For each blast, document the following:
  - Location of blast in relation to Project stationing or state plane coordinate system and elevation.
  - 2. Date and times of loading and detonation of blast.
  - 3. Name of person in responsible charge of loading and firing.
  - 4. Details of blast design, as previously specified.
  - Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.
  - 6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.
  - 7. Comments by BIC regarding damage to existing facilities, adjacent property, or completed Work, misfires, fly rock occurrences, unusual results, or unusual effects as required.

# 3.12 SUSPENSION OF BLASTING

- A. In event damage to existing facilities, adjacent property, or completed Work occurs due to blasting, immediately suspend blasting and report damage to ENGINEER and OWNER. CONTRACTOR shall be responsible for all costs of repairs or replacement due to damage from blasting.
- B. Before resuming blasting operations, adjust design of subsequent blasts, or take other appropriate measures to control effects of blasting, and submit complete description of proposed changes for reducing potential for future damage.
- C. Do not resume blasting until authorized by OWNER and applicable regulatory authorities.

### 3.13 ROCK REMOVAL B MECHANICAL METHOD

- A. Excavate and remove rock by the mechanical method. Drill holes and utilize mechanical impact to fracture rock.
- B. In utility trenches, excavate 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- C. Stockpile excavated materials and reuse select materials for site landscaping. Remove and dispose of excess materials offsite at approved location.
- Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02220.

# 3.14 PAYMENT

A. Rock excavation shall be bid as unclassified and will **not** be paid for separately.

# EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall make excavations in such widths and depths as will give suitable room for below grade vaults, laying pipe to the lines, grades and elevations, furnish, place and compact all backfill materials specified herein or denoted on the Drawings. The materials, equipment, labor, etc., required herein are to be considered as part of the requirements and costs for installing the various pipes, structures and other items they are incidental to.

### 1.2 RELATED WORK

- A. Section 02221-Rock Removal
- B. Section 02610 Water Pipe and Fittings.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Crushed stone material shall conform with the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.
- B. Two classes of crushed stone material are used in this Section. The type of material in each class is as follows:
  - 1. Class I No. 9 Aggregate.
  - 2. Class II Dense Graded Aggregate (DGA).

# PART 3 - EXECUTION

# 3.1 EXCAVATION OF TRENCHES

- A. Unless otherwise directed by the Engineer, trenches are to be excavated in open cuts.
  - 1. Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to, or just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed.
  - 2. Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery. However, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.
- B. Trenches shall be sufficient width to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
  - The Contractor shall remove only as much of any existing pavement as is necessary for the
    prosecution of the Work. The pavement shall be cut with pneumatic tools, without extra
    compensation to the Contractor, to prevent damage to the remaining road surface. Where
    pavement is removed in large pieces, it shall be disposed of before proceeding with the
    excavation.
- C. All excavated materials shall be placed a safe distance back from the edge of the trench.

- D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor.
- E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
- F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

### 3.2 WATER PIPE BEDDING

- A. Piping for water mains shall be supported as follows:
  - 1. The trench bottom for water main piping shall be stable, continuous, relatively smooth and free of frozen material, clodded dirt, foreign material and rock or granular material larger than 1/2 inch in diameter. The foundation for water main piping shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. Any uneven areas in the trench bottom shall be shaved-off or filled-in with Class I granular bedding. When the trench is made through rock, the bottom shall be lowered to provide 6 inches of clearance around the pipe. Class I granular bedding shall be used to bring the trench bottom to grade.
- B. After each pipe has been brought to grade, aligned, and placed in final position, earth material for water main piping in areas not subject to vehicular traffic and Class I material for water mains in paved areas, shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations.
- C. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- D. Where an unstable (i.e., water, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate.
- E. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required Class I bedding material can be placed.
- F. It should be noted that no pipe shall be laid on solid or blasted rock.
- G. Pipe bedding as required in Paragraphs A, B, C, and D of this Section is **not** considered a separate pay item.

# 3.3 WATER PIPE BACKFILLING

- A. Initial Backfill:
  - 1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 6 inches above the top of the pipe. For water main piping in areas not subject to vehicular traffic, initial backfill material shall be earth material free of rocks, acceptable to the Engineer or with Class I material when a condition exists mentioned in Paragraph A, 3. below. For water main piping in paved areas, initial backfill shall be Class I material.

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- 2. Material used, whether earth or Class I, in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of water main.
- 3. In areas where large quantities of rock are excavated and the available excavated earth in the immediate vicinity is insufficient for placing the required amount of backfill over the top of the pipe as set forth in Paragraph A.1, the Contractor shall either haul in earth or order Class I material for backfilling over the pipe. Neither the hauling and placement of earth nor the ordering and placement of Class I material to fulfill the backfill requirements set forth herein is considered a separate pay item.

# B. Final Backfill:

- 1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
  - a. Case I Areas not subject to vehicular traffic.
  - b. Case II Paved areas including streets, drives, parking areas, and walks.
- 2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
  - a. Case I The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 8 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The remainder of the trench shall be backfilled with earth material reasonably free of any rocks.
  - b. Case II The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 12 inches below the existing pavement surface with Class I (No. 9 crushed stone aggregate) material. The backfill shall be mechanically tamped in approximately 6-inch layers to obtain the maximum possible compaction. The remaining backfill shall be as follows:
  - For gravel surfaces Class II (dense graded aggregate) material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
  - d. For bituminous and concrete surfaces Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
- 3. Earth and Class I material used in final backfill is not a separate pay item. Payment shall be included in the price of water main.
- Class II material used in final backfill shall be included in the unit price of the pipe.
- C. A sufficient amount of Class II material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

### 3.4 COMPACTION

- A. Place backfill in 6- to 8-inch lifts and compact thoroughly.
- B. Granular Material
  - 1. Field compaction shall consist of vibratory plate
  - 2. Obtain 85% relative density (ASTM-4253 and D-4254)
- C. Earth Material
  - 1. Field compaction shall consist of self propelled sheepsfoot or pad foot
  - 2. Obtain 90% standard density (ASTM D-698)

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# 3.5 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed and shall be Lineguard brand encased aluminum foil, Type III. The identification tape is manufactured by Lineguard, Inc., P.O. Box 426, Wheaton, IL 60187.
- B. The identification tape shall bear the printed identification of the utility line below it, such as "Caution Buried Below". Tape shall be reverse printed; surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be 2 inches in width. Colors are: yellow gas, green sewer, red electric, blue water, orange telephone, brown force main.
- C. The tape shall be the last equipment installed in the trench so as to be first out. The tape shall be buried 4 to 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to the Owner or Engineer.

### 3.6 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic water mains and force mains. Care shall be taken to insure that the buried wire is not broken.
- B. The location wire shall be no smaller than #10 AWG solid copper-coated steel wire with minimum 550 lb. tensile strength or #12 AWG stranded wire, either copper-coated steel or solid copper with minimum 300 lb. tensile strength; each with HDPE insulating jacket. Wire requirements are based on electrical resistance per 1000 foot length. Copper-coated steel wire is preferred to reduce the likelihood of vandalism theft.
- C. The location wire shall be continuous from valve box to valve box and shall be terminated (unconnected) with a wire nut and enough "loose" wire to extend 24 inches outside the valve box.

# HORIZONTAL DIRECTIONAL DRILLING

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. This section shall apply for the horizontal direction drill of service sleeves.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 02610 Water Pipe and Fittings
  - 2. Section 02660 Domestic Water Distribution Connections

# 1.2 QUALITY ASSURANCE

- A. Referenced Standards:
  - 1. American Society for Testing and Materials (ASTM):
    - a. F1962, Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.

### 1.3 SUBMITTALS

- A. Shop Drawings:
  - See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.

### PART 2 - PRODUCTS

### 2.1 GENERAL

A. The Contractor shall provide all materials, equipment, and labor for completing the subaqueous crossings and for adequate protection of the Work.

# 2.2 MATERIALS

- A. Drilling Materials:
  - The drilling materials used by the Contractor to aid in the horizontal drilling operations shall be of the Contractor's choosing. Products shall comply with environmental regulations applicable to this project.
- B. Drilling Fluids:
  - 1. Drilling fluids used in the drilling operation shall be a mixture of bentonite and water or such other fluids of the Contractor's choosing.
  - 2. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Owner.
  - The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

# PART 3 - EXECUTION

# 3.1 COORDINATION OF WORK

A. The Contractor shall coordinate his work with the agencies, corporations, and individuals owning or having jurisdiction of the roadway crossing.

### 3.2 INSTALLATION

A. General:

1. The Contractor shall install the pipeline under the roadway by the horizontally drilled, directionally controlled method of construction. The Contractor shall comply with the applicable portions of ASTM F1962.

### B. Instrumentation:

- 1. The Contractor will provide and maintain instrumentation which will accurately locate the drill at all times. The Contractor shall provide and use a separate steering system employing a ground survey grid system, such as "TRU-TRACKER" or equal wherever possible.
- 2. The Contractor will provide and maintain instrumentation which will accurately measure drilling fluid flow discharge rate and pressure.
- 3. The Contractor shall provide continuous access to these instruments and their readings to the Owner and Engineer at all times.

# C. Tolerances:

1. The Contractor shall make every effort to have the exit point located where shown on the Plans. In no case shall the actual exit point be located farther than 10 feet (along the length of the pipe) from the intended exit point or more than 5 feet on either side perpendicular to the pipe at the exit point location shown.

# 3.3 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, existing pipe and appurtenances removed by the Contractor, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

# WATER PIPE AND FITTINGS

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install water main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

### 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities.
- B. Section 02630 Encasement Pipe.
- C. Section 02640 Water Valves and Gates.
- D. Section 02675 Disinfection of Potable Water Pipe.

# PART 2 - PRODUCTS

# 2.1 DUCTILE IRON PIPE (DIP) AND FITTINGS

- A. Ductile iron pipe (DIP) shall conform to ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 Standard. The pipe shall conform to pressure class 350 minimum unless noted otherwise. All fittings and joints should be capable of accommodating pressure of not less than 250 psi.
- B. Fittings shall be ductile iron 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 and shall conform to the details and dimensions shown therein. Fittings shall have rubber gasket joints meeting the requirements of AWWA C111. Fittings shall be cement-mortar lined and bituminous coated to conform to the latest revision of ANSI/AWWA standards.
- C. Ductile iron mechanical joint fittings shall be in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 (or A21.53 for compact fittings) and have joints in accordance with ANSI/AWWA C111/A21.11. Fittings and joints shall be supplied with all accessories.
- D. All mechanical joints for fittings and valves shall be restrained with friction type griper wedges as manufactured by EBAA Iron Megalug 2000PV or boltless type gripper system as manufactured by Romac Field-LOK, or approved equivalent systems.
- E. Gasket material for all push-on and mechanical joint ductile iron pipe and fittings where ductile iron pipe is lain within a 200 foot radius of existing petroleum, gasoline, and oiling lines and tanks shall be hydrocarbon and petroleum resistant. Gasket materials shall be made of nitrile (NBR) or citroen rubber.
- F. All ductile fittings shall be rated at 250 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 70-50-05 per ASTM Specification A339-55.
- G. Cement mortar lining and seal coating for pipe and fittings, where applicable shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.
- H. Where indicated, high-density, cross-laminated polyethylene film shall be provided for encasement of ductile iron pipe. The film shall meet the requirements of AWWA C105.

- I. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.
- J. Ductile iron pipe and fittings shall be as manufactured by U.S. Pipe & Foundry Company, American Cast Iron Pipe Company, or approved equivalent.

# 2.2 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Polyvinyl chloride (PVC) pipe for water mains shall be Class 250 (SDR 17) pressure rated pipe with either twin gasket joints or integral bell joints with rubber O-ring seals. All class 250 pipe shall meet the requirements of SDR 17.
- B. All PVC pipe shall conform to the latest revisions of ASTM D-1784 (PVC Compounds), ASTM D-2241 (PVC Plastic Pipe, SDR), and ASTM D-2672 (Bell-end PVC Pipe). PVC pipe shall have a minimum cell classification of 12454B or 12454C as defined in ASTM D-1784. Rubber gasketed joints shall conform to ASTM D-3139. The gaskets for the PVC pipe joint shall conform to ASTM F-477 and D-1869.
- C. PVC restrained push-on joints shall be Certainteed Certa-LOK Yelomine SDR 17 pressure pipe meeting the requirements of ASTM D2241 and ASTM D3139. Restrained joint pipe shall be provided as called for on the Drawings.
- D. Fittings for all lines 4 inches in diameter or larger shall be 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. Cement mortar lining and seal coating shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C110/A21.10. All fittings shall be rated at 250 psi water working pressure plus water hammer and be ductile cast-iron grade 70-50-05 per ASTM Specification A339. Fittings shall be restrained in accordance with Article 2.1D.
- E. 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. Appropriate thrust blocks shall be provided for the fittings.
- F. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor during the bidding phase shall determine the number of fittings required and include the cost of the fittings and installation in the unit price for pipe.
- G. Rubber gasket joints shall provide adequate expansion to allow for a 50 degree change in temperature on one length of pipe. Lubrication for rubber connected couplings shall be water soluble, non-toxic, be non-objectionable in taste and odor and have no deteriorating affect on the PVC or rubber gaskets and shall be as supplied by the pipe manufacturer.
- H. All pipe and couplings shall bear identification markings that will remain legible during normal handling, storage and installation, which have been applied in a manner what will not reduce the strength of the pipe or the coupling or otherwise damage them. Pipe and coupling markings shall include the nominal size and OD base, material code designation, dimension ratio number, ASTM Pressure Class, ASTM designation number for this standard, manufacturer's name or trademark, seal (mark) of the testing agency that verified the suitability of the pipe material for potable-water service. Each marking shall be applied at intervals of not more than 5 feet for the pipe and shall be marked on each coupling.

# PART 3 - EXECUTION

#### 3.1 LAYING DEPTHS

A. In general, water mains shall be laid with a minimum cover of 48 inches, except as otherwise indicated on the Drawings.

### 3.2 SEWER/CONTAMINANT PIPE CROSSING CONCRETE ENCASEMENT

- A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, concrete encasement shall be used when the clearance between the proposed water pipe and any existing sewer or contaminant carrying pipe is 18 inches or less. Contaminant carrying pipe includes underground petroleum, slurry, food processing, and other pipe as determined by the Engineer.
- B. Whether the proposed water pipe is above or below the existing sewer/contaminant pipe, the concrete shall fully encase the sewer/contaminant pipe and extend to the spring line of the water pipe. Encasement shall extend in each direction along the sewer/contaminant pipe until the encased sewer/contaminant pipe is 10 feet from the proposed water main, measured perpendicular to the water main.
- C. Concrete shall be 3,000 psi and shall be mixed sufficiently wet to permit it to flow between and under the pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints.
- D. Concrete for this Work is not a separate pay item and will be considered incidental to water pipe installation.

# 3.3 PIPE LAYING

- A. Slip Jointed Pipe:
  - 1. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
  - 2. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
  - 3. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
  - 4. Anchorage of Bends:
    - a. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by using both concrete thrust blocking and joint restraint. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair.
    - b. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.
  - 5. In addition to the anchorage provided in Item 4 above, all mechanical joint fittings and valves shall be restrained as called for in Article 2.1. Foster adapters shall be installed on all fittings to valve connections.

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- 6. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such deficiencies that are noted later.
- 7. All joint surfaces shall be cleaned immediately before jointing the pipe. The joint shall be lubricated in accordance with the pipe manufacturer's recommendations. Each pipe unit shall then be carefully pushed into place without damage to pipe or gasket. All pipe shall be provided with home marks to insure proper gasket seating. Details of gasket installation and joint assembly shall follow the manufacturer's direction for the joint type and material of the pipe. The resulting joints shall be watertight and flexible.

# 3.4 TESTING OF WATER PIPE

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, water pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to the Owner.
- B. Water main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated working pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated working pressure. A pipe section shall be accepted if the test pressure does not fall more than 5 psi during the minimum 2-hour test period. The pipe shall be tested for allowable leakage according to AWWA C-600 or C-605, as applicable, concurrently with the pressure test.
- C. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 6,000 feet. Testing shall proceed from the source of water toward the termination of the line. The line shall be tested upon the completion of the first 6,000 feet. After the completion of two (2) consecutive tests without failure, the Contractor, at his option and with the Engineer's approval, may discontinue testing until the system is complete.
- D. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.
- E. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air vents are not located at high points within the test section, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water.
- F. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be defined as the quantity of water that must be supplied to the tested section to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The leakage shall be less than an allowable amount determined by the following equation:

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

Where: L = allowable leakage (gallons/hour)

S = length of pipe tested, in feet

D = nominal diameter of pipe (inches)

P = test pressure (psig)

G. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.

H. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

# 3.5 PLACEMENT OF IDENTIFICATION TAPE

A. The placement of detectable underground marking tape shall be installed over all water mains as specified in Section 02225.

# 3.6 PLACEMENT OF LOCATION WIRE

A. The placement of detectable underground location wire shall be installed above all non-metallic water main as specified in Section 02225.

# **ENCASEMENT PIPE**

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install encasement pipe together with all appurtenances as shown and detailed on the Drawings and specified herein.

### 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 Water Pipe and Fittings.

### PART 2 - PRODUCTS

### 2.1 STEEL PIPE

- A. Steel seamless pipe shall be new Grade B steel material, with a minimum yield of 35,000 psi and a wall thickness as shown below unless otherwise required by a permitting authority. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ARC) Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- B. The minimum wall thickness shall be in accordance with the following table:

# **Steel Casing Pipe Wall Thickness**

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
16 and under	0.250	0.250

- C. Welds of the steel casing pipe shall be solid butt-welds with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- D. The wall thickness at any point shall be within 12.5% inches of the nominal metal thickness specified.
- E. Hydrostatic testing shall not be necessary.
- F. A protective internal and external coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or Porter International Primer 260FD (red), or an equivalent thickness of an approved equivalent paint shall be applied in the manner recommended by the respective paint manufacturer.
- G. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.
- H. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

# 2.3 PVC PIPE

A. PVC SDR 17/21 pressure rated pipe with integral bell joints with O-ring seals or PVC SDR 35 pipe conforming to ASTM D 3034 and ASTM F-679.

### 2.4 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than ½ inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)	
2 - 2-1/2	4	
3 - 8	7	
10 - 26	10	

C. The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer's recommendations.

# 2.5 ENCASEMENT PIPE END SEALS

After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
  - 1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.

- 2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one section of casing pipe, the jacks and blocking. The Contractor shall furnish and use adequate equipment to maintain the line and grade.
- C. The carrier pipe shall be ductile iron, polyvinyl chloride, or polyethylene pipe as designated on the Drawings. The carrier pipe shall be installed using pipe spacers as described in this Section. Carrier pipe will not be permitted to rest on bells or couplings.
- D. Following installation of the carrier pipe, the ends of the encasement pipe shall be sealed with products of the type described in this Section.

### 3.2 DAMAGE

A. The cost of repairing damage to the highway or railroad which is caused by a boring and jacking installation shall be borne by the Contractor.

# WATER VALVES AND GATES

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install valves together with all appurtenances as shown and detailed on the Drawings and specified herein.

### 1.2 1RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 Water Pipe and Fittings.
- C. Section 02645 Hydrants.

#### 1.3 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer two (2) copies of an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of the latest revision of the applicable AWWA Standard, and that all tests specified therein have been performed and that all test requirements have been met.
- C. The Engineer shall be furnished two (2) copies of an affidavit that the "Valve Protection Testing" has been done and that all test requirements have been met.
- D. The Engineer shall be furnished with two (2) copies of an affidavit that inspection, testing and rejection are in accordance with the latest revision of the applicable AWWA Standard.

# PART 2 - PRODUCTS

### 2.1 GATE VALVES

- A. All gate valves shall be of the resilient seat type in accordance with the latest revision of AWWA C509 Standard. The valve body, bonnet and gate castings shall be ductile iron or cast iron. The valve shall have a non-rising stem (NRS), fully bronze mounted or stainless steel with o-ring seals. Valve body and bonnet, inside and out, shall be fully coated with fusion bonded epoxy coating in accordance with AWWA C550 Standard. Valves shall have a rated working pressure of 200 psi.
- B. Gate valves for buried service shall be furnished with mechanical joint end connections, unless otherwise shown on the Drawings or specified herein. The end connection shall be suitable to receive ductile iron or PVC pipe.
- C. All gate valves shall have the name or monogram of the manufacturer, the year the valve casting was made, the size of the valve, and the working pressure cast on the body of the valve.
- D. Buried service gate valves shall be provided with a 2-inch square operating nut and shall be opened by turning to the left (counterclockwise).
- E. Buried service gate valves shall be installed in a vertical position with valve box as detailed on the Drawings. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.
- F. Valves shall be those manufactured by Mueller, M & H Valve Company, American or approved equivalent.

# 2.2 AIR RELEASE VALVES

- A. The air release valves shall have a 1-inch inlet pipe thread capable of handling working pressures up to 160 psi and be equivalent to APCO Series 200A, as manufactured by Valve and Primer Corp.
- B. The valves shall be in accordance with ANSI/AWWA C512.
- C. The valves shall be of the type that automatically vents small pockets of air as they accumulate at high points in the system while the system is operating and pressurized. The overall height less back wash accessories shall not exceed 21 inches. Valves shall be constructed of ductile iron body and cover, stainless steel float, needle, linkage with a Buna-N seat for positive seating.
- D. The baffle shall be ductile iron and shall protect float from direct impact of air and water. The seat shall slip fit into the baffle or cover and lock in place without any distortion. The float and baffle assembly shall be shrouded with a water diffuser. The float shall be stainless steel center guided for positive seating and be rated at 1,000 psi non-shock service.
- E. The discharge orifice shall be fitted with a double-acting throttle device to regulate and restrict air venting.
- F. All parts of the valves and the operating mechanisms shall be made of non-corrodible materials.
- G. Exhausting large quantities of air during filling of the system shall be accomplished through the use of fire hydrants and manual air releases installed by the Contractor. Cost for any manual air releases shall be incidental to the pipeline construction and are not a separate pay item.

#### 2.3 VALVE BOXES

- A. Each buried stop and valve shall be provided with a suitable valve box. Boxes shall be of the adjustable, telescoping, heavy-pattern type with the lower part of cast iron and the upper part of steel or cast iron. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.
- B. The upper or sliding section of the box shall be provided with a flange having sufficient bearing area to prevent undue settlement. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and rest on the valve bonnet.
- C. The boxes shall be adjustable through at least 6 inches vertically without reduction of the lap between sections to less than 4 inches.
- D. The inside diameter of boxes for valves shall be at least 4-1/2 inches, and the lengths shall be as necessary for the depths of the valves or stops with which the boxes are to be used.
- E. Covers for valves shall be close fitting and substantially dirt-tight.
- F. The top of the cover shall be flush with the top of the box rim. An arrow and the word OPEN to indicate the direction of turning to open the valve shall be cast in the top of the valve covers.

# 2.4 COUPLING ADAPTER

- A. The pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) steel middle ring, of thickness and length specified, two (2) steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. Field joints shall be made with this type of coupling. The middle ring and followers of the coupling shall be true circular sections free from irregularities, flat spots, or surface defects. They shall be formed from mill sections with the follower-ring section of such design as to provide confinement of the gasket. After welding, they shall be tested by cold expanding a minimum of 1 percent beyond the yield point. The coupling bolts shall be of the elliptic-neck, track-head design with rolled threads. The manufacturer shall supply information as to the recommended torque to which the bolts shall be tightened. All bolt holes in the followers shall be oval for greater strength. The gaskets of the coupling shall be composed of a crude or synthetic rubber base compounded with other products to produce a material which will not deteriorate from age, from heat, or exposure to air under normal storage conditions. It shall also possess the quality of resilience and ability to resist cold flow of the material so that the joint will remain sealed and tight indefinitely when subjected to shock, vibration, pulsation and temperature or other adjustments of the pipe line. 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.
- B. Nuts and bolts shall be in accordance with AWWA C111.
- C. Couplings shall be shop primed and field painted in accordance with Division 9 (or one coat of coal tar epoxy if not specified in Division 9).
- D. Compression couplings shall be equivalent to Style 38 manufactured by Dresser. Flanged couplings shall have flanges in accordance with AWWA C207 and be equivalent to Style 128 manufactured by Dresser.

### 2.5 FIBERGLASS LINE MARKER FOR BURIED VALVES

### A. General:

- Design: The continuous fiberglass reinforced composite line marker shall be a single piece
  marker capable of simple, permanent installation by one person using a manual driving tool.
  The marker, upon proper installation, shall resist displacement from wind and vehicle
  impact forces. The marker shall be of a constant flat "T" cross-sectional design with
  reinforcing support ribs incorporated longitudinally along each edge to provide sheeting
  protection and structural rigidity. The bottom end of the marker shall be pointed for ease of
  ground penetration.
- 2. Material: The marker shall be constructed of a durable, UV resistant, continuous glass fiber and marble reinforced, thermosetting composite material which is resistant to impact, ozone, and hydrocarbons within a service temperature range of -40° F to +140° F.
- 3. Workmanship: The marker shall exhibit good workmanship and shall be free of burns, discoloration, cracks, bulges or other objectionable marks which would adversely affect the marker's performance or serviceability.
- 4. Marking: Each marker shall be permanently marked "Water Line Below." The letters shall be a minimum of 2 inches in height. A black line shall be stamped horizontally across the front of the marker near the bottom to indicate proper burial depth as shown in the standard detail. The marker shall be a CRM-375 as manufactured by Carsonite International, or approved equivalent.

# B. Physical and Mechanical Requirements:

- 1. Dimensions: The marker shall conform to the shape and overall dimensions shown in the standard detail.
- 2. Mechanical Properties: The marker shall have the minimum mechanical properties as follows:

Property	ASTM Test Method	Minimum Value
Ultimate Tensile Strength	D-638	50,000 psi
Ultimate Compressive Strength	D-638	45,000 psi
Specific Gravity	D-792	1.7
Weight % Glass Reinforcement	D-2584	50%
Barcol Hardness	D-2583	47

- Color Fastness: The marker shall be pigmented throughout the entire cross-section so as to
  produce a uniform color which is an integral part of the material. Ultraviolet resistant
  materials shall be incorporated in the construction to inhibit fading or cracking of the
  delineator upon field exposure.
- 4. Vehicle Impact Resistance: The marker shall be capable of self-erecting and remain functional after being subjected to a series of ten head on impacts by a typical passenger sedan at 35 miles per hour. The marker shall retain a minimum of 60 percent of its sheeting.

#### C. Reflectors:

- 1. The reflector shall be of impact resistant, pressure sensitive retro-reflective sheeting which shall be subject to approval by the Engineer. The sheeting shall be of appropriate color to meet MUTCD requirements.
- 2. Mounting: The retro-reflective sheeting shall consist of a minimum of a 3-inch wide strip placed a maximum of 2 inches from the top of the post unless otherwise specified.

### PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. Valves shall be installed as nearly as possible in the positions indicated on the Drawings consistent with conveniences of operating the handwheel or wrench. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.
- C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense.
- D. Valves shall not be installed with stems below the horizontal.
- E. Valves shall be set plumb and supported adequately in conformance with the instructions of the manufacturer.
- F. Valves shall be provided with extension stems where required for convenience of operation. Extension stems shall be provided for valves installed underground and elsewhere so that the operating wrench does not exceed 6 feet in length.

### 3.2 PAINTING

A. Valves shall be factory primed and fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.

### **HYDRANTS**

# **PART 1 - GENERAL**

# 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, materials, and equipment required to complete the work of installing fire and flush hydrants with all appurtenances as shown on the Drawings and specified herein.

# PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Each hydrant shall be installed with an auxiliary gate valve and valve box; valve box cover shall be marked "water" as required.
- B. Inlet cover depth shall be minimum of 36 inches and the minimum dimension from ground to centerline of lowest opening shall be 18 inches. Hydrants shall be supported on a poured-in-place concrete thrust block and provided with a drainage pit as indicated on Standard Detail Sheet.
- C. All hydrants shall be fully coated, inside and out, with fusion bonded epoxy coating in accordance with AWWA C550 Standard and color shall be as selected by the Owner.

#### 2.2 FIRE HYDRANTS

A. Fire hydrants shall be improved AWWA compression model with 5-1/4 inch hydrant valve, two (2) 2-1/2 inch hose outlets, one (1) 4-1/2 inch pumper nozzle, national standard threads, national standard pentagon operating nut opening left. Fire hydrant shall be equipped with safety flanges designed to prevent barrel breakage when struck by a vehicle, flanged inlets and auxiliary gate valves. Fire hydrants shall have 6-inch inlets. Fire hydrants shall be Mueller Super Centurion 200 as manufactured by Mueller Company, or approved equivalent.

# 2.3 SPARE PARTS

A. The Owner shall be furnished with two (2) hydrant barrel wrenches, four (4) spanner wrenches and two (2) operating nut wrenches.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

A. Fire and flush hydrants shall be installed in accordance with the manufacturer's directions and as detailed on the Drawings.

# DOMESTIC WATER DISTRIBUTION CONNECTIONS

# **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

- A. The Contractor shall furnish all labor and equipment necessary to install water service piping together with tapping saddle and corporation stop as shown and detailed on the Drawings and specified herein.
- B. The Contractor shall all materials associated with the distribution connection and water meter relocation including but not limited to: meter boxes and setters, PE water service piping, 2" PVC sleeve, tapping saddle, corporation stop and valve box and lid.

# 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities.
- B. Section 02640 Water Valves and Gates.
- C. Section 02675 Testing and Disinfection of Potable Water Pipe.

# PART 2 - PRODUCTS

### A. SADDLES

Saddles shall be for PVC or DI pipe equal to the Ford S70 Series. <sup>3</sup>/<sub>4</sub> - inch and 1- inch services shall have direct insertion of corporation stops.

### B. CORPORATION STOP

- 1. Corporation stops to be used with copper pipe with compression type connections, where connected into PVC pipe, shall be the same, except with compression type outlet connections. Stops shall be Ford F-1000.
- 2. Corporation stops shall be factory tested to 150 psi to be compatible with the pipes in which they are installed.

#### C. METER BOX

1. Ford 18" x 24" plastic meter box with extra heavy cast iron frame and lid.

### D. CURB BOX

1. Ford EM2-40 or approved equivalent. Provide with key tube and steel stationary rod with ductile iron tee head socket and brass cotter pin and plug style lid.

# E. PE SERVICE PIPE AND FITTINGS

- 1. Polyethylene pipe shall be extruded from high density pipe resin and meet the requirements of AWWA C901-08 PE Pressure and Pipe and Tubing for Water Service.
- 2. Provide HDPE pipe with working pressure rating of 250 PSI with dimension ratio of DR 7 meeting the requirements of ASTM D2239, Inside Diameter Controlled HDPE Pipe (IPS/SIDR).
- 3. Pipe shall meet all applicable provisions of the Commercial Standards and shall bear the National Sanitation Foundation (NSF) seal of approval.

# F. PVC SLEEVE

Service pipe shall be installed in 2 inch Schedule 40 PVC Sleeve across under roadways.

# PART 3 - EXECUTION

# 3.1 INSTALLATION

- A. All service connections shall be installed in the locations shown, rigidly supported.
- B. After installation, all service connections shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the Engineer.
- C. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all fittings checked for tightness. All materials which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the Owner.
- D. Provide curb box at each corporation stop.

### 3.2 INSPECTION AND TESTING

A. All service connections shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected, device replaced or otherwise made acceptable to the Engineer.

# DISINFECTION OF POTABLE WATER PIPE

# **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material and water necessary to disinfect the potable water pipe as shown on the Drawings and specified herein.

# 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities.
- B. Section 02610 Water Pipe and Fittings.
- C. Section 02640 Water Valves and Gates
- D. Section 02660 Domestic Water Distribution Connections

# PART 2 - PART 2 - PRODUCTS (NOT USED)

# PART 3 - PART 3 - EXECUTION

### 3.1 DISINFECTION OF WATER LINES

- A. Sterilization of pipe line shall be in accordance with the American Water Works Association Specification C651-05 using granular HTH. Use of chlorine tablets will not be allowed.
- B. The pipe line shall be disinfected by using a 50 mg/l chlorine solution for a contact period of 24 hours. At the end of the 24 hour retention period, the required residual shall be 25 ppm. Pipes shall be thoroughly flushed upon meeting the chlorine residual requirements.
- C. Before the pipes are placed in service, samples of the water must be taken by the Contractor and submitted to the public health agency for testing. No pipes shall be placed in service until the samples have been approved by the agency. The Contractor shall bear all the cost of sampling, testing, and postage.
- D. Sampling locations shall be approved by the Engineer and the public health agency having jurisdiction.
- E. A satisfactory report for the section(s) under test must be submitted to the owner and the Engineer before authorizing domestic consumption of the water.
- F. Sterilization procedures shall be continued until approved samples have been obtained.

# **CAST-IN-PLACE CONCRETE**

# **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

- A. Formwork.
- B. Reinforcing Steel.
- C. Expansion and Contraction Joints.
- D. Waterstops
- E. Concrete.

# 1.2 RELATED REQUIREMENTS

- A. Section 00710 General Conditions.
- B. Section 02225 Excavation, Backfilling and Compacting for Utilities.

### 1.3 REFERENCES

- A. ACI 350R Environmental Engineering Concrete Structures.
- B. ACI318 Building Code Requirements for Reinforced Concrete.
- C. ACI347 Recommended Practice for Concrete Formwork.
- D. CRSI Manual of Standard Practice.
- E. CRSI Placing Reinforcing Bars.
- F. ASTM A-615, A-120, A-185, C-31, C-39

### 1.4 SUBMITTALS

- A. The Contractor shall submit the following data to the Engineer for review:
  - 1. Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
  - 2. Certification by the manufacturer that cement meets the Specification contained herein.
  - 3. Shop drawing for reinforcing steel showing bar schedules, location, and splices.
  - 4. Reports on laboratory compression tests of cylinders taken during concrete placement.
  - 5. Manufacturer's cut sheets for all other concrete related products.

# PART 2 - PRODUCTS

# 2.1 CLASSES OF CONCRETE AND USAGE

- A. Structural concrete of the various classes required shall be proportioned to produce the following 28-day compressive strengths:
  - 1. Selection of Proportions for 4,500 psi Concrete:
    - a. 4,500 psi compressive for strength at 28 days.
    - b. Type I/II cement plus air.
    - c. Maximum water/cement ratio 0.42.
    - d. Minimum cement content 564 lbs. (6.0 bags)/cubic yard concrete.
    - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).

- f. Air content 5% plus or minus 1% by volume.
- g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture. Additional slump is allowed by use of water reducing or superplasticizing admixtures.
- 2. Selection of Proportions for 3,000 psi Concrete:
  - a. 3,000 psi compressive strength at 28 days.
  - b. Type I/II cement plus air.
  - c. Maximum water/cement ratio 0.56.
  - d. Minimum cement content 470 lbs. (5.0 bags)/cubic yard concrete.
  - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
  - f. Air content 5% plus or minus 1% by volume.
  - g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture.
- B. Concrete shall be used as follows:
  - 1. 4,500 psi concrete for all concrete work except as noted below.
  - 2. 3,000 psi concrete for encasement of piping where indicated, and thrust blocking.
- C. All testing of aggregates and determination of proportions shall be or have been performed by a recognized independent testing laboratory.
- D. Cement for exposed concrete shall have a uniform color classification.
- E. Type I/II cement conforming to ASTM C-150 shall be used in all concrete.
- F. Coarse aggregate shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amount of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to all requirements of ASTM C-33.
- G. Fine aggregates shall be natural sand having clean, hard, uncoated grains, free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33.
- H. Water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

### 2.2 ADMIXTURES

- A. An air entraining admixture shall be used on all concrete and shall be the neutralized vinsol resin type such as Master Builders MB-VR, Euclid Chemical Company AIR-MIX or equivalent. The admixture shall meet the requirements of ASTM C-260.
- B. Other admixtures (water reducing agents, acellerating agents, retarding agents, superplasticizing agents) shall be considered where necessary to meet the needs of construction.
- C. Admixtures shall be used in concrete design mixes in the same manner and proportions as in the field so that the effects of the admixtures are included in preliminary test submitted to the Engineer for review prior to the start of construction.

# 2.3 REINFORCEMENT

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615. All bar reinforcement shall be deformed.
- B. Welded wire fabric shall conform to ASTM A-185 and shall be of weight and gauge as indicated on the Drawings.

C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high-density polyethylene tips so that the metal portion shall be at least one-quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

### 2.4 FORMS

- A. Forms shall be of suitable material, design, and construction so as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces with a tolerance of 1/16-inch in 4 feet.
- B. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gauge metal, new plywood (used plywood which, in the opinion of the Engineer, is substantially equal to new plywood may be used), tempered wood fiberboards with smooth surface, or similar materials. Metal forms or form linings shall have square edges so that the concrete will not have fins or fluting. Forms shall not be pieced out by use of materials different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface.
- C. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, metal, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Metal forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16-inch.
- D. Form for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms for exposed surfaces shall be built with 3/4-inch chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.
- F. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
  - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1 inch to the face of the concrete.
  - 2. That part of the tie which is to be removed shall be at least 1/2-inch in diameter, or if smaller, it shall be provided with a wood or metal cone 1 inch long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
  - 3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

# 2.5 OTHER MATERIALS

- A. Anchorage items shall be of standard manufacture and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the Engineer.
- B. Premolded expansion-joint filler strips shall conform to ASTM D-1752 and shall be 3/8-inch thick unless otherwise shown.
- C. Joint sealants shall conform to ANSI 116.1. The following joint sealants are acceptable:
  - 1. Colma by Sika Corporation.
  - 2. Hornflex by A. C. Horn, Inc.
  - 3. Sonolastic by Sonneborn Division of Contech, Inc.

### D. Grout:

- 1. Precision-support grout shall consist of a non-shrink, ready-to-use, precision grout material; proportioned, pre-mixed and packaged at the factory; delivered to the job site to place with only the addition of water; forming, placing and curing as stipulated by the manufacturer.
- 2. Grouts which depend upon aluminum powders, chemicals, or other agents which produce gas for expansion are not acceptable.
- 3. Precision-support grout shall also meet the following requirements:
  - a. Free of gas producing agents.
  - b. Free of oxidizing catalysts.
  - c. Free of inorganic accelerators, including chlorides.

# E. Construction Joint Waterstops:

- 1. Polyvinylchloride (PVC) Waterstops:
  - a. Provide PVC waterstops complying with Corps of Engineers CRD-C572.
  - b. Provide serrated type with a minimum thickness of 3/8 inch by a minimum width of 6 inches may be provided in specific applications as approved by the ENGINEER.
  - c. Provide PVC waterstops as manufactured by Greenstreak Plastic Products company; Vinylex Corporation, or equivalent product.
- 2. Adhesive Waterstop:
  - a. Provide pre-formed adhesive waterstop in construction joint locations where shown, or as alternative to PVC waterstop where appropriate.
  - b. The preformed waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210A, "Sealing Compounds for Expansion Joints".
  - c. Provide adhesive waterstops as manufactured by Synko-Flex Products, Division of Henry Products, Inc.; or equivalent product.
- 3. Hydrophilic Waterstops:
  - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
  - b. Provide waterstops as manufactured by Greenstreak Plastic Products Company; Adeka, Inc.; or equivalent product.
- F. Membrane Forming Curing compound: ASTM C 309, Type I-D.
  - 1. Provide without fugitive dye when requested by Engineer.
- G. Epoxy Bonding Agent: Provide two-component epoxy resin bonding agent as manufactured by Sika Chemical Corporation; A.C. Horn, Incorporated; or equivalent product.

# H. Adhesive Dowels:

- 1. Drilling equipment used and installation of adhesive dowels shall be in accordance with manufacturer's instructions.
- 2. Assure that embedded items are protected from damage and are not filled in with concrete.
- 3. Unless otherwise shown or approved by Engineer, embedment depths shall be based on a compressive strength of 2,500 psi when embedded into existing concrete.)
- 4. The Contractor shall comply with the adhesive material manufacturer's installation instructions on the hole diameter. The Contractor shall properly clean out the hole utilizing a synthetic brush and compressed air to remove all loose material from the hole, prior to installing adhesive capsules or material. Proper mixing of the two-component system shall be done to the manufacturer's recommendations.
- 5. Adhesive material manufacturer's representative shall observe and demonstrate the proper installation procedures for the adhesive dowels and adhesive material at no additional expense to the Owner. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.
- 6. Provide two-component dowel installation adhesive as manufactured by Hilti Corporation, or approved equivalent product.

### PART 3 - EXECUTION

### 3.1 FORMING

- A. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions and to the elevations indicated on the Drawings or specified, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.
- B. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- C. All falsework to support structural slabs, beams, girders, etc., shall be designed to safely and adequately support the concrete and forms during placement and curing. The adequacy and safety of the falsework shall be the sole responsibility of the Contractor.
- D. All forms shall be oiled with an acceptable nonstaining oil or liquid form coating before reinforcement is placed.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.
- F. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of days-degrees \*:
  - 1. Beams and slabs: 500 day-degrees.
  - 2. Walls and vertical surfaces: 100 day-degrees.
  - \*Day-degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily average temperature of 60 degrees F, equals 300 day-degrees.
- G. Shores under beams and slabs shall not be removed until the concrete has attained at least 60 percent of the specified compressive strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

### 3.2 PLACING REINFORCEMENT

- A. Reinforcement shall be bent cold to the dimensions and shapes shown on the Drawings and within tolerances specified in the CRSI Manual of Standard Practice.
- B. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- C. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- D. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- E. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- F. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

### 3.3 TESTING AGGREGATES AND DETERMINING PROPORTIONS

- A. No concrete shall be used in the work until the materials and mix design have been accepted by the Engineer.
- B. The conformity of aggregates to the Specifications hereinbefore given shall be demonstrated and determined by tests per ASTM C-33 made with representative samples of the materials to be used on the work.
- C. The actual proportions of cement, aggregates, admixtures and water necessary to produce concrete conforming to the requirements set forth herein shall be determined by making test cylinders using representative samples of the materials to be used in the work. A set of four standard 6-inch cylinders shall be made and cured per ASTM C-31. Two shall be tested at 7 days and two at 28 days per ASTM C-39. The slump shall not be less than the greatest slump expected to be used in the work.
- D. Reports on the tests and a statement of the proportions proposed for the concrete mixture, shall be submitted in triplicate to the Engineer for review as soon as possible, but not less than five days prior to the proposed beginning of the concrete work. If the Contractor furnishes in writing, similar, reliable detailed information from an acceptable source, and of date not more than four months prior to the time when concrete will be used on this project, the above requirements for laboratory test may be modified by the Engineer. Such data shall derive from mixtures containing constituents, including the admixtures where used, of the same types and from the same sources as will be used on this project.
- E. The Engineer shall have the right to make check tests of aggregates and concrete, using the same materials, and to order changes as may be necessary to meet the specified requirements.
- F. The Contractor may request permission to add water at the job site; and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case shall the total water per bag of cement exceed the ratio set forth herein.
- G. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

### 3.4 MIXING

- A. All central-plant and rolling-stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Association, as well as the ACI Standards for measuring, Mixing and Placing Concrete (ACI 614), and with the ASTM Standard Specification for Ready-Mixed Concrete, Designation C94, insofar as applicable.
- B. Ready-mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.
- C. Central-mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch, and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the premixed concrete is placed in the truck and shall continue without interruption until discharge. For transit-mixed concrete the major portion of the mixing water shall be added and mixing started immediately after the truck is charged.
- D. The amount of water initially added shall be recorded on the delivery slip for the Engineer's information; no additional water shall be added, either in transit or at the site, except as directed. Mixing (at mixing speed) shall be continued for at least 10 minutes followed by agitation without interruption until discharge. Concrete shall be discharged at the site within 1-1/2 hours

- after water was first added to the mix, and shall be mixed at least 5 minutes after all water has been added.
- E. Concrete which has become compacted or segregated during transportation to or in the site of the work shall be satisfactorily remixed just prior to being placed in the forms.
- F. Partially hardened concrete shall not be deposited in the forms. The retempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

### 3.5 COMPRESSION TESTS

- A. During the progress of the work, at least one (1) set of four (4) compression test cylinders shall be made for each 50 cubic yards of concrete or major fraction thereof, and not less than one such set for each type of concrete for each day's pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, Designation C31, except that wherever possible molds shall be left on the cylinders until they have reached the laboratory. Testing services to satisfy the requirements of ACI shall be paid for by the Contractor at his expense. Testing lab must be approved by the Engineer.
- B. One cylinder of each set shall be broken in accordance with ASTM C-39 at seven (7) days and the other two at twenty-eight (28) days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.
- C. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.

### 3.6 METALWORK IN CONCRETE

- A. All trades shall be notified, at the proper time, to install items to be embedded in concrete.
- B. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed, and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed.
- C. Anchor bolts shall be set by means of substantial templates.

### 3.7 PLACING AND COMPACTING CONCRETE

- A. At least twenty-four (24) hours before the Contractor proposes to make any placement of concrete, he shall notify the Engineer of his intention and planned procedure. Unless otherwise permitted, the work shall be so executed that a section begun an any day shall be completed during daylight of the same day.
- B. No concrete shall be placed until the subgrade has been accepted in accordance with the requirements of Section 01400, Quality Control, nor shall it be placed on frozen subgrade or in water. Placement of concrete shall not be scheduled until the forms, reinforcing, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free form rust, scale, oil, or any other foreign matter.
- C. Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thorough wetted just prior to placement of concrete.
- D. Concrete placed at air temperatures below 40 degrees shall have a minimum temperature of 50 degrees F. and a maximum of 70 degrees F. when placed.
- E. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable and by methods which will prevent separation of ingredients and avoid rehandling.

- F. Chutes for conveying concrete shall be metal or metal-lined and of such size, design, and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall be not flatter than 1 on 2 and all parts of a chute shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or, if required, a spout; and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.
- G. In thin sections of considerable height (such as walls and columns), concrete shall be placed in such a manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, etc., shall be used as required or permitted unless the forms are provided with suitable openings.
- H. Chutes, hoppers, spouts, etc., shall be thoroughly cleaned before and after each run and the water and debris shall not be discharge inside the form.
- I. For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain, until the completion of the unit, an approximately horizontal, plastic surface.
- J. No wooden spreaders shall be left in the concrete.
- K. During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal-type mechanical vibrators operating at not less than 5,000 rpm., or other tool spading, to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried on in such a manner and only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface, shall be avoided.
- L. The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

### 3.8 BONDING CONCRETE AT CONSTRUCTION JOINTS

- A. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any, and then roughened.
- B. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which all pools shall be removed. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be 1/8-inch thick on vertical surfaces and 1/4-inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

### 3.9 CURING AND PROTECTION

A. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slab, etc., shall be ponded to a depth of 1/2-inch wherever practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.

- B. For at least seven (7) days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F.
  - 1. No manure, salt, or other chemicals shall be used for protection.
  - 2. Wherever practicable, finished slabs shall be protected form the direct rays of the sun to prevent checking and crazing.

### 3.10 TRIMMING AND REPAIRS

- A. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.
- B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired.
- C. Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but less than 1 inch deep. The remaining concrete shall be thoroughly roughened and cleaned. Concrete around the cavity or the form-tie recess shall be thoroughly wetted and promptly painted with a 1/16-inch brush coat of neat cement mixed to the consistency of lead paint. The hole shall then be filled with mortar.
  - 1. Mortar shall be 1:1-1/2 cement and sand mix with sufficient white cement, or fine limestone screenings in lieu of sand, to produce a surface matching the adjoining work. Cement and sand shall be from the same sources as in the parent concrete.
  - 2. For filling form-tie recesses, the mortar shall be mixed slightly damp to the touch (just short of "balling"), hammered into the recess until it is dense and an excess of paste appears on the surface, and then troweled smooth. Mortar in patches shall be applied so that after partial set it can be compressed and rubbed to produce a finish flush and uniform in texture with the adjoining work. All patches shall be warm-moist cured as above specified.
- D. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the masonry replaced by means of a cement gun, or the masonry shall be taken down and rebuilt, all as the Engineer may decide or direct.

### 3.11 SURFACE FINISH

- A. Fins and irregularities on formed surfaces to receive no other finish shall be smoothed.
- B. The top of concrete on which other concrete or unit masonry will later be placed shall be struck off true at the surface indicated on the Drawings or as permitted by the Engineer, as the concrete is being placed. As soon thereafter as the condition of the concrete permits and before it has hardened appreciably (normally within 2 hours after being deposited), all water, scum, laitance, and loose aggregate shall be removed from the surface by means of wire or bristle brooms in such a manner as to leave the coarse aggregate slightly exposed and the surface clean.
- C. Concrete surfaces shall be finished as follows, except as otherwise required by various sections of the Specifications or shown on the Drawings.
  - 1. Wood-float finish shall be given to all top, substantially horizontal, exposed surfaces.
  - 2. Burlap-rubbed finish shall be given to all interior and exterior surfaces placed against forms which will be exposed to view on completion of the work. (Finish shall be to one foot below ground and below normal liquid surface elevations).
  - 3. All surfaces shaped without forms and over which liquids will flow shall be given a steel-trowel finish.
  - 4. Concrete surfaces to which roof insulation or roofing are to be applied shall be finished sufficiently smooth to receive the roofing material, as obtained by steel trowel or very smooth wood-float finish.

### 3.12 METHOD OF FINISHING

A. Broomed Finish: Surfaces to be given broomed finish shall first be given a steel-trowel finish. Immediately after troweling, the surface shall be lightly brushed in one direction with a hair broom to produce a nonslip surface of uniformly good appearance.

### B. Wood-float Finish:

- 1. Surfaces to be given a wood-float finish shall be finished by tamping with special tools to force aggregates away from the surface, and screeding with straight edges to bring the surface to the required line.
- 2. As soon after the condition of concrete permits and before it has hardened appreciably, all water, film, and foreign material which may work to the surface shall be removed. Rough finishing shall be done with straight edges and derbies. Machine floating if used, shall not be started until the surface will support the float adequately without digging in and bringing excess fines to the surface. At such time, a minimum of machine and hand floating with a wood float shall be employed to bring the finish to a true and uniform surface with no coarse aggregate visible.
- 3. Under no circumstances will sprinkling with water or dusting with cement be permitted during finishing of the slab.
- C. Steel Trowel Finish: Surfaces to be given a steel-trowel finish shall first be given a wood-float finish. This shall be followed by hand troweling with steel trowels to bring the surface to a uniform, smooth, hard, impervious surface free from marks and blemishes. Troweling shall not be started until all water has disappeared from the surface. Over-troweling shall be avoided. Dusting with dry cement or other mixtures or sprinkling with water will not be permitted in finishing.

### D. Burlap Rubbed Finish:

- 1. Immediately after the forms have been stripped and before the concrete has changed in color, all fins and other projections shall be carefully removed by use of a hammer or other suitable means, and imperfections shall be repaired as hereinbefore specified under "Trimming and Repairs". While the surface is still damp, a thin coat of cement slurry of medium consistency shall be applied by means of bristle brushes to provide a bonding coat within pits and minor blemishes in the parent concrete; the coating of large areas of the surface with this slurry shall be avoided.
- 2. Before the slurry has dried or changed color, a dry (almost crumbly) grout composed of 1 volume of cement to 1-1/2 volumes of masonry sand shall be applied. The sand shall have a fineness modulus of approximately 2.25 and comply with the gradation requirements of the ASTM Standard Specifications for Aggregate for Masonry Mortar, Designation C144-76.
- 3. The grout shall be uniformly applied by means of damp (neither dripping wet nor dry) pads of burlap of convenient size (approximately 6 inches square) and shall be allowed to harden for one to two hours, depending on the weather. In hot, dry weather the surface shall be kept damp by means of a fine fog spray during the hardening period.
- 4. When the grout has hardened sufficiently, but before it becomes so hard as to be difficult to remove, excess grout shall be scraped from the surface of the parent concrete by the edge of a steel trowel, without removing the grout from the imperfections. Thereafter, the surface shall be allowed to dry thoroughly and then be rubbed vigorously with burlap to remove all dried grout so that no visible film remains on the surface after the rubbing. The entire cleaning operation for any area shall be so planned that sufficient time is allowed for the grout to dry and be rubbed after it has been cut with the trowel.
- 5. On the day following the grouting and burlap rubbing, the concrete surface shall again be rubbed clean with a dry burlap to remove inadvertent dust. If any built-up film remains on the parent surface, it shall be removed by being rubbed with a fine abrasive stone without breaking through the surface film of the original concrete. Such rubbing shall be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of the concrete. Following the final rubbing with burlap or abrasive stone, the surface shall be thoroughly washed with stiff bristle brushes (worked only along parallel lines) to remove extraneous materials from the surface. The surface shall then be sprayed

- with a fine fog spray to maintain a continually damp condition for at least three (3) days after application of the grout.
- 6. When the burlap-rubbed finish has been completed, the concrete surface shall be smooth, free from discolorations and stains, and of uniformly good appearance.

### 3.13 HOT WEATHER CONDITIONS

A. Placing of concrete under conditions of high temperature, low humidity or wind shall be done in accordance with the American Concrete Institute "Hot Weather Conditions" (latest edition).

### 3.14 COLD WEATHER CONDITIONS

A. Cold weather concreting procedures precautions shall conform with American Concrete Institute "Cold Weather Concreting" (latest edition).

### **END OF SECTION**

## 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-placepipe (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 INVSTIGATION This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confided 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 bypass pumping, `I`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 f o r use. If required on plans and/or proposed adjoining DIP is restrained, force main valves s h a 11 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 LOCATE This bid item is to pay for all labor, equipment, and materials needed in locating an existing sanitary sewer service lateral for tie-in of the lateral to new mainline sewers and/or for the relocation of a lateral. This bid item shall be inclusive of any and all methods and efforts required to locate the lateral for tie-in or relocation of the lateral. Locating methods to be included under this items shall include, but are not limited to, those efforts employing the use of video cameras from within an existing sanitary sewer main or lateral, electronic locating beacons and/or tracers inserted into the sanitary sewer main or lateral, careful excavation as a separate operation from mainline sewer or lateral excavation, the use of dyes to trace the flow of a lateral, or any combination of methods required to accurately locate the lateral. 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 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 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. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). 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. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). 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. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). 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. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). 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. Measurement shall be from contact point to contact point of old and new 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).

**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.

# TECHNICAL SPECIFICATIONS for US 42 SEWER LINE RELOCATION Carrollton Utilities

February 2016

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### TECHNICAL SPECIFICATIONS US 42 SEWER LINE RELOCATION CARROLLTON UTILITIES

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### SUMMARY OF WORK

### PART 1 - GENERAL

### 1.1 WORK INCLUDED

- A. Relocation of approximately 10,910 lineal feet of sewer force main, pumping station and appurtenances in Carroll County, Kentucky.
- B. The Contractor shall provide all materials, labor and equipment necessary for completion of the Project. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the Project shall be included.
- C. Continuous Operations: The existing system must be maintained in continuous operation in such a manner that it meets all local, state, and federal requirements. The Contractor is responsible not to deactivate, demolish, or interfere with any system component required for the continuous operation until a new or temporary permanent-like system has been installed and is operational. The Contractor is responsible for payment of all fines resulting from any action or inaction on his part or the part of his subcontractors during performance of the Work that causes the facility/facilities to operate in an illegal manner or fail to operate in a legal manner.
- D. The construction of the following major Work items are included in the Contract:
  - 1. 10,910 lineal feet of 6-inch DR 11 HDPE force main pipe
  - 2. 650 lineal feet of HDD of 6-inch DR 11 HDPE pipe across McCools Creek
  - 3. 95 lineal feet of 8-inch steel encasement pipe, bore and jack
  - 4. 150 lineal feet of 3-inch PVC SDR 21 force main pipe
  - 5. Five (5) force main tie-ins to existing force main
  - 6. Five (5) gate valves
  - 7. Four (4) combination air valves
  - 8. By-pass pumping
  - 9. Duplex grinder pump station
  - 10. Abandonment and removal of manholes, wet well and vault structures

### 1.2 PERMITS

A. The Contractor shall obtain any permits related to or required by, the Work in this Contract.

### 1.3 CODES

A. Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations and similar communications, to the Owner.

### 1.4 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which a portion must remain functional. The Contractor must maintain the required items and/or systems functional without additional effort by the Owner's personnel and at no extra costs to the Owner.
- B. The Contractor is responsible for verifying all existing conditions, elevations, dimensions, etc., and providing his finished work to facilitate existing conditions.

### **END OF SECTION**

### **WORK SEQUENCE**

### PART 1 - GENERAL

### 1.1 WORK INCLUDED

- A. The Contractor shall conform to all miscellaneous requirements as contained in the Contract.
- B. The Contractor shall perform all Work included in the Contract Documents [Drawings].
- C. The Contractor shall perform the entire Work incidental to the items shown in the Contract Documents [Drawings] even though it may not be specifically enumerated.
- D. The Contractor will have to perform the work in a sequence acceptable to the Owner, and in some instances the Work will have to be performed in a sequence directed by the Owner.
- E. Further, the Contractor shall have to perform all the Work included in this project in a sequence that does not cause undue hardships on day-to-day operating personnel.

### 1.2 RELATED REQUIREMENTS

- A. Section 01010 Summary of Work.
- B. Section 01040 Coordination.

### PART 2 - PRODUCTS (NOT APPLICABLE)

### PART 3 - EXECUTION

### 3.1 SCHEDULING THE SEQUENCE OF CONSTRUCTION OPERATIONS

- A. The Contractor shall submit to the Engineer, for review and approval, a complete schedule (progress chart) of his proposed sequence of construction operations prior to commencement of the work.
- B. The Engineer will neither consider nor approve a construction schedule that fails to utilize the entire time allocated by the Contract for the construction of the Project.
- C. The Contractor shall schedule the various construction activities to complete the Project throughout the entire Contract time period. This schedule requirement shall not prevent the Contractor from completing the Project in a shorter time frame than illustrated in the schedule. The construction schedule along with a cost breakdown schedule shall be reviewed and approved by the Owner prior to the submission of the first partial payment request in accordance with the General Conditions.
- D. A copy of the construction schedule shall be submitted to the Owner with each pay request, appropriately marked to indicate the actual progress of the work compared to the planned schedule. This revised schedule must be approved by the Owner prior to payment.

### **END OF SECTION**

### **SUBMITTALS**

### PART 1 - GENERAL

### 1.1 WORK INCLUDED

A. Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

### 1.2 DEFINITIONS

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

### 1.3 CONTRACTOR'S ULTIMATE RESPONSIBILITY

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

### 1.4 GENERAL REQUIREMENTS FOR SUBMITTALS

- A. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Documents. Where applicable, show fabrication, layout, setting and erection details. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting or erection details of equipment, materials and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for his distribution plus three (3) which will be retained by the Engineer and Owner. Shop drawings shall be folded to an approximate size of 8-1/2 inch x 11 inch and in such manner that the title block will be located in the lower righthand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

- C. Where samples are required, they shall be adequate to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. All submittals shall be referenced to the applicable item, section and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s) and shall be accompanied by transmittal forms in the format provided by the Engineer.
- E. The Contractor shall review and check submittals, and indicate his review by initials and date.
- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefor. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.
- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- Submittals for all electrically operated items (including instrumentation and controls) shall
  include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding,
  all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

### 1.5 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers and similar data.
- B. Coordinate each submittal with requirements of Work and Contact Documents.
- C. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which required submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

### 1.6 SUBMITTAL SCHEDULE

- A. At a minimum the following submittals shall be submitted for review and approval:
  - 1. Work Sequence
  - 2. Tie-In Details
  - 3. HDPE Pipe and Fittings
  - 4. Steel Encasement Pipe, Spacers and End Seals
  - 5. Sewer Line Markers
  - 6. Combination Air/Vacuum Valves
  - 7. Pump Station, Control Panel and Electrical Drawings
  - 8. By-pass Pumping Plan
  - 9. Tracer Wire, and Identification Tape

### **END OF SECTION**

### OPERATING AND MAINTENANCE DATA

### PART 1 - GENERAL

### 1.1 WORK INCLUDED

- A. Compile product data and related information appropriate for Owner's maintenance and operation of equipment furnished under the contract. Prepare operating and maintenance data as specified.
- B. Instruct Owner's personnel in the maintenance and operation of equipment and systems as outlined herein.
- C. In addition to maintenance and operations data, the manufacturer's printed recommended installation practice shall also be included. If not part of the operations and maintenance manual, separate written installation instructions shall be provided, serving to assist the Contractor in equipment installation.

### 1.2 RELATED REQUIREMENTS

- A. Section 00710 General Conditions.
- B. Section 01340 Submittals.
- C. Section 01720 Project Record Documents.
- D. Section 01740 Warranties and Bonds.

### 1.3 MAINTENANCE AND OPERATIONS MANUAL

- A. Every piece of equipment furnished and installed shall be provided with the following maintenance and operations manuals:
  - 1. One (1) copy in electronic format, on compact disk, furnished for the Engineer's review as to adequacy and completeness. Preferred electronic format is .pdf file. Following review, the Contractor shall cause any changes required to be made, and shall store all manuals until the completion of the project or until requested by the Engineer. The manuals will be stored and delivered to the Engineer, organized as described in this specification.
  - 2. Two (2) final copies, with all required changes, in print format, furnished to the Owner.
  - 3. Four (4) final copies, with all required changes, on compact disk. Two (2) copies furnished to Owner, two (2) copies furnished to Engineer. Format shall be .pdf file.
- B. The final form of the manuals shall be utilized in instructions of the Owner's personnel.

### 1.4 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.
- B. Format for hard copies:
  - 1. Size: 8-1/2 x 11 in.
  - 2. Paper: 20 pound minimum, white, for typed pages.
  - 3. Text: Manufacturer's printed data, or neatly typewritten.
  - 4. Drawings:
    - a. Provide reinforced punched binder tab, bind with text.
    - b. Fold large drawings to the size of the text pages where feasible.
    - c. For all drawings included within manuals, furnish a 8 mil mylar copy in standard size drawings 36" x 24", 8" x 16" or 8-1/2" x 11".
    - d. For flow or piping diagrams that cannot be detailed on the standard size drawings, a larger, appropriate size drawing may be submitted.

- 5. Provide fly-leaf for each separate product, or each piece of operating equipment.
  - a. Provide typed description of product, and major component parts of equipment.
  - b. Provide indexed tabs.
- 6. Cover: Identify each volume with types or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
  - a. Title of Project.
  - b. Identity of separate structure as applicable.
  - c. Identity of general subject matter covered in the manual.

### C. Binders:

- 1. Commercial quality, durable and cleanable, 3-hole, 3" or 4" post type binders, with oil and moisture resistant hard covers.
- 2. When multiple binders are used, correlate the data into related consistent grouping.
- 3. Labeled on the front cover and side of each binder shall be the name of the Contract, the Contract Number and Volume Number.

### 1.5 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
  - 1. Contractor, name of responsible principal, address and telephone number.
  - 2. A list of each product required to be included, indexed to the content of the volume.
  - 3. List, with each product, the name, address and telephone number of:
    - a. Subcontractor or installer.
    - b. Maintenance contractor, as appropriate.
    - c. Identify the area of responsibility of each.
    - d. Local source of supply for parts and replacement.
  - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

### B. Product Data:

- 1. Include only those sheets which are pertinent to the specific product. References to other sizes and types or models of similar equipment shall be deleted or lined out.
- 2. Annotate each sheet to:
  - a. Clearly identify the specific product or part installed.
  - b. Clearly identify the data applicable to the installation.
  - c. Provide a parts list for all new equipment items, with catalog numbers and other data necessary for ordering replacement parts.
  - d. Delete references to inapplicable information.
- 3. Clear and concise instructions for the operation, adjustment, lubrication, and other maintenance of the equipment including a lubrication chart.

### C. Drawings:

- 1. Supplement product data with drawings as necessary to clearly illustrate:
  - a. Relations of component parts of equipment and systems.
  - b. Control and flow diagrams.
- 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
- 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
  - 1. Organize in a consistent format under separate headings for different procedures.
  - 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued: Provide information sheet for Owner's personnel.
  - 1. Proper procedures in the event of failure.
  - 2. Instances which might affect the validity of warranties or bonds.

- F. The electronic copies of the manuals shall be submitted to the Engineer for review at the same time that the equipment to which it pertains is delivered at the site. The manuals must be approved by the Engineer before final payment on the equipment is made.
- PART 2 PRODUCTS (NOT USED)
- PART 3 EXECUTION (NOT USED)

**END OF SECTION** 

### SHORING AND BRACING

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Shore and brace sidewalls in excavations with steel sheet piles with wale systems or soldier piles with timber lagging and tie back system as required to protect existing buildings, utilities, roadways, and improvements.
- B. Maintain shoring and bracing during construction activities, and remove shoring and bracing if practical when construction and filling is complete.
- C. Geotechnical investigation borings, if applicable, were drilled for this project where indicated on the drawings in the report. The geotechnical report was not prepared for purposes of bid development and the accuracy of the report is limited. The Contractor should confer with a geotechnical engineer and/or conduct additional study in the area to obtain the specific type of geotechnical information required for construction and for preparation of bids.

### 1.2 SUBMITTALS

A. Provide copies of information on methods of the shoring and bracing system proposed for the work, design basis, calculations where applicable, and copies of shop drawings for inclusion in the project and job-site record files.

### 1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Shoring and bracing system design shall be prepared and sealed by a registered professional engineer or structural engineer. The system design shall provide the sequence and method of installation and removal. Shoring and bracing system design shall be in accordance with Occupational Safety and Health Administration (OSHA) requirements 29 CFR Section 1926.652.

### PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Steel Sheet Piles: Heavy-gauge steel sheet.
- B. Soldier Piles: Steel H-beams.
- C. Timber Lagging: Heavy timber. Pressure treated with wood preservative for use below water table for extended time period.

### PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install in proper relation with adjacent construction. Coordinate with work of other sections.
- B. Locate shoring and bracing to avoid permanent construction. Anchor and brace to prevent collapse.

### **END OF SECTION**

### **ROCK REMOVAL**

### PART 1 - GENERAL

### 1.1 WORK INCLUDED

- A. The Contractor shall excavate rock, if encountered, as required to perform the required work, and shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.
- B. In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid.

### 1.2 REFERENCES

- A. NFPA 495 Code for the Manufacture, Transportation, Storage and use of Explosive Materials.
- B. Commonwealth of Kentucky Department of Mines and Minerals, Laws and Regulations Governing Explosives and Blasting.

### 1.3 REGULATORY REQUIREMENTS

- A. Conform to Kentucky Department of Mines and Minerals code for explosive disintegration of rock.
- B. Obtain permits from local authorities having jurisdiction before explosives are brought to site or drilling is started.
- C. KRS 351.330
- D. 805 KAR Chapter 4

### PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Rock definition: Solid mineral material that cannot be removed with a power shovel.
- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay devices: Type recommended by explosives firm and conforming to state regulations.
- D. Blasting mat materials: Type recommended by explosives firm and conforming to state regulations.

### PART 3 - EXECUTION

### 3.1 EXPLOSIVES

- A. The Contractor shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. He shall notify the Engineer, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distance from the explosives. When the need for explosives has ended, all such materials remaining on the Work shall be promptly removed from the premises.
- B. The Contractor shall observe all state, federal and municipal laws, ordinances and regulations relating to the transportation, storage, handling and use of explosives. In the event that any of the above-mentioned laws, ordinances or regulations require a licensed blaster to perform or supervise the Work of blasting, said licensed blaster shall, at all times have his license on the Work and shall permit examination thereof by the Engineer or other officials having jurisdiction.

### 3.2 BLASTING PRECAUTIONS

- A. No explosives shall be used within 20 feet of:
  - 1. Building and/or structures existing, constructed or under construction.
  - 2. Underground and/or overhead utilities whether existing or partially constructed.
- B. Permission for any deviation from the restriction set forth above shall be secured from the Engineer, in writing; however, permission for any such deviations shall not relieve the Contractor from any responsibility in the event of damage to buildings, structures or utilities.
- C. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.
- D. The Contractor shall be solely responsible for his blasting operations. The Contractor shall not hold the Owner and/or the Engineer liable for any damages resulting from his blasting operations on this project.

### 3.3 PREBLAST STRUCTURE SURVEY

- A. Perform a preblast survey to determine and document with pictures the condition of adjacent structures, utilities, wells, buried cables, and other features within a minimum of 400 ft. of the blast area unless otherwise required by applicable regulatory authorities. Determine safe distances to structures or other facilities according to NFPA 495, Appendix B. Where facilities are closer than these distances, and natural barriers are not present, or when the amount of explosive cannot be reduced economically, blasting mats shall be used. Provide mats to protect environmentally sensitive areas, trees within 20 feet from the blasting area, streams, and rock formations from throw rock.
- B. Purpose of survey is to document existing condition of structures prior to blasting, and is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as result of blasting.
- C. Conduct survey prior to start blasting.
- D. Record information for each structure surveyed:
  - 1. Age and type of construction.
  - 2. Location and character of cracks.
  - 3. Evidence of settlement and leakage.
  - 4. Other pertinent information.
- E. Record preblast survey information on forms prepared specifically for preblast surveys.
- F. Supplement written records with photographs or videotape recordings.
- G. Submit copies of written records and photographs or videotapes to respective property owner, as well as, OWNER and ENGINEER, prior to start of blasting.

### 3.4 BLAST DESIGN

- A. Design each blast to avoid damage to existing facilities, adjacent property, and completed Work. Consider effects of blast-induced vibrations and air blast, and fly rock potential in design of each blast.
- B. Whenever peak particle velocity exceeds vibration limits, change design of subsequent blasts, as necessary to reduce peak particle velocity to within limits established by BIC.
- C. Whenever air blast exceeds limits, change design of subsequent blasts or provide controls necessary to reduce air blast to within specified limits.

### 3.5 VIBRATION LIMITS

A. General: Establish appropriate maximum limit for vibration for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to vibration, and federal, state, or local regulatory requirements, but not to exceed 1.25 in/sec.

### 3.6 AIR-BLAST LIMITS

A. Establish appropriate maximum limit for air blast for each structure or facility that is adjacent to or near blast sites. Base maximum limits on expected sensitivity of each structure or facility to air blast, and federal, state, or local regulatory requirements, but not to exceed 0.015 psi peak overpressure (133 decibels).

### 3.7 FLY ROCK CONTAINMENT

A. Where fly rock may damage existing facilities, adjacent property, or completed Work, cover area to be blasted with blasting mats or provide other means that will contain and prevent scattering of blast debris.

### 3.8 VIBRATION AND AIR-BLAST MONITORING

- A. Monitor and record blast-induced vibrations and air blast using suitable sensors and recording equipment for each blast.
- B. Contractor shall provide two (2) seismographs during blasting operations capable of the following:
  - 1. Designed for monitoring blast-induced vibrations and air blast. Capable of recording particle velocity in three mutually perpendicular directions in range from 0 to 6 inches per second.
  - 2. Flat vibration frequency response between 4- and 200-Hz.
  - 3. Capable of recording air-blast overpressure up to 140 decibels.
  - 4. Flat air-blast frequency response between 2- and 500-Hz.
- C. Monitor on, or at, structures or other facilities that are closest to point of blasting. Monitoring more distant facilities that are expected to be sensitive to blast-induced vibrations and air blast.
- D. BIC shall supervise establishment of monitoring programs and initial operation of equipment; review interpretation of records and recommend revisions of blast designs.
- E. Include following information in blasting plan.
  - 1. Vibration and air-blast limits as recommended by BIC.
  - 2. Name of qualified BIC who will be responsible for monitoring program and interpretation of records.
  - 3. Types and models of equipment proposed for monitoring.
  - 4. Numbers and locations of proposed monitoring stations.
  - 5. Procedures to be used for coordinating recording of each blast.
  - 6. Steps to be taken if blasting vibrations or air blast exceed limits.

### 3.9 EXPLOSIVES

A. The CONTRACTOR shall keep explosives on the site only in such quantity as may be needed for the Work under way and only during such time as they are being used. Notify the OWNER, in advance, of provisions to store and use explosives.

### 3.10 BLASTING PRECAUTIONS

- A. Permission for any deviation from the blasting plan and other specified restrictions shall be secured from the OWNER and applicable authorities, in writing; however, permission for any such deviations shall not relieve the CONTRACTOR from any responsibility in the event of damage to buildings, structures or utilities.
- B. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such a manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not to be excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, where required. Sufficient warning shall be given to all persons in the vicinity of the Work before a charge is exploded.

C. The CONTRACTOR shall be solely responsible for his blasting operations. The CONTRACTOR shall not hold the OWNER and/or the ENGINEER liable for any damages resulting from his blasting operations on this project.

### 3.11 BLASTING RECORDS

- A. For each blast, document the following:
  - Location of blast in relation to Project stationing or state plane coordinate system and elevation.
  - 2. Date and times of loading and detonation of blast.
  - 3. Name of person in responsible charge of loading and firing.
  - 4. Details of blast design, as previously specified.
  - Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.
  - 6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.
  - 7. Comments by BIC regarding damage to existing facilities, adjacent property, or completed Work, misfires, fly rock occurrences, unusual results, or unusual effects as required.

### 3.12 SUSPENSION OF BLASTING

- A. In event damage to existing facilities, adjacent property, or completed Work occurs due to blasting, immediately suspend blasting and report damage to ENGINEER and OWNER. CONTRACTOR shall be responsible for all costs of repairs or replacement due to damage from blasting.
- B. Before resuming blasting operations, adjust design of subsequent blasts, or take other appropriate measures to control effects of blasting, and submit complete description of proposed changes for reducing potential for future damage.
- C. Do not resume blasting until authorized by OWNER and applicable regulatory authorities.

### 3.13 ROCK REMOVAL B MECHANICAL METHOD

- A. Excavate and remove rock by the mechanical method. Drill holes and utilize mechanical impact to fracture rock.
- B. In utility trenches, excavate 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- C. Stockpile excavated materials and reuse select materials for site landscaping. Remove and dispose of excess materials offsite at approved location.
- Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 02220.

### 3.14 PAYMENT

A. Rock excavation shall be bid as unclassified and will **not** be paid for separately.

### **END OF SECTION**

### EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

### **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

A. The Contractor shall make excavations in such widths and depths as will give suitable room for below grade vaults, laying pipe to the lines, grades and elevations, furnish, place and compact all backfill materials specified herein or denoted on the Drawings. The materials, equipment, labor, etc., required herein are to be considered as part of the requirements and costs for installing the various pipes, structures and other items they are incidental to.

### 1.2 RELATED WORK

- A. Section 02221-Rock Removal
- B. Section 02732 Sewage Force Mains

### PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Crushed stone material shall conform with the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.
- B. Two classes of crushed stone material are used in this Section. The type of material in each class is as follows:
  - 1. Class I No. 9 Aggregate.
  - 2. Class II Dense Graded Aggregate (DGA).

### PART 3 - EXECUTION

### 3.1 EXCAVATION OF TRENCHES

- A. Unless otherwise directed by the Engineer, trenches are to be excavated in open cuts.
  - 1. Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to, or just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed.
  - 2. Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery. However, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.
- B. Trenches shall be sufficient width to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
  - The Contractor shall remove only as much of any existing pavement as is necessary for the
    prosecution of the Work. The pavement shall be cut with pneumatic tools, without extra
    compensation to the Contractor, to prevent damage to the remaining road surface. Where
    pavement is removed in large pieces, it shall be disposed of before proceeding with the
    excavation.
- C. All excavated materials shall be placed a safe distance back from the edge of the trench.

- D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor.
- E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
- F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

### 3.2 SEWER PIPE BEDDING

- A. Piping for sewer mains shall be supported as follows:
  - 1. The trench bottom for sewer main piping shall be stable, continuous, relatively smooth and free of frozen material, clodded dirt, foreign material and rock or granular material larger than 1/2 inch in diameter. The foundation for sewer main piping shall be prepared so that the entire load of the backfill on top of the pipe will be carried uniformly on the barrel of the pipe. Any uneven areas in the trench bottom shall be shaved-off or filled-in with Class I granular bedding. When the trench is made through rock, the bottom shall be lowered to provide 6 inches of clearance around the pipe. Class I granular bedding shall be used to bring the trench bottom to grade.
- B. After each pipe has been brought to grade, aligned, and placed in final position, earth material for sewer main piping in areas not subject to vehicular traffic and Class I material for sewer mains in paved areas, shall be deposited and densified under the pipe haunches and on each side of the pipe up to the spring line of the pipe to prevent lateral displacement and hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations.
- C. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- D. Where an unstable (i.e., sewer, mud, etc.) trench bottom is encountered, stabilization of the trench bottom is required. This is to be accomplished by undercutting the trench depth and replacing to grade with a foundation of crushed stone aggregate.
- E. The depth of the foundation is dependent upon the severity of the trench bottom. The size of stone aggregate used in the foundation will be determined by the condition of the unstable material. Once the trench bottom has been stabilized, the required Class I bedding material can be placed.
- F. It should be noted that no pipe shall be laid on solid or blasted rock.
- G. Pipe bedding as required in Paragraphs A, B, C, and D of this Section is **not** considered a separate pay item.

### 3.3 SEWER PIPE BACKFILLING

- A. Initial Backfill:
  - 1. This backfill is defined as that material which is placed over the pipe from the spring line to a point 6 inches above the top of the pipe. For sewer main piping in areas not subject to vehicular traffic, initial backfill material shall be earth material free of rocks, acceptable to the Engineer or with Class I material when a condition exists mentioned in Paragraph A, 3. below. For sewer main piping in paved areas, initial backfill shall be Class I material.

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- 2. Material used, whether earth or Class I, in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of sewer main.
- 3. In areas where large quantities of rock are excavated and the available excavated earth in the immediate vicinity is insufficient for placing the required amount of backfill over the top of the pipe as set forth in Paragraph A.1, the Contractor shall either haul in earth or order Class I material for backfilling over the pipe. Neither the hauling and placement of earth nor the ordering and placement of Class I material to fulfill the backfill requirements set forth herein is considered a separate pay item.

### B. Final Backfill:

- 1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
  - a. Case I Areas not subject to vehicular traffic.
  - b. Case II Paved areas including streets, drives, parking areas, and walks.
- 2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 6 inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
  - a. Case I The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 8 inches below the surface of the ground with earth material free from large rock (greater than 6 inches in the longest dimension), acceptable to the Engineer. The remainder of the trench shall be backfilled with earth material reasonably free of any rocks.
  - b. Case II The trench shall be backfilled from a point 6 inches above the top of the pipe to a point 12 inches below the existing pavement surface with Class I (No. 9 crushed stone aggregate) material. The backfill shall be mechanically tamped in approximately 6-inch layers to obtain the maximum possible compaction. The remaining backfill shall be as follows:
  - c. For gravel surfaces Class II (dense graded aggregate) material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer.
  - d. For bituminous and concrete surfaces Bituminous and concrete pavement sections as detailed on the Drawings and as specified for Bituminous Pavement Replacement and Concrete Pavement Replacement.
- 3. Earth and Class I material used in final backfill is not a separate pay item. Payment shall be included in the price of sewer main.
- 4. Class II material used in final backfill shall be included in the unit price of the pipe.
- C. A sufficient amount of Class II material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

### 3.4 COMPACTION

- A. Place backfill in 6- to 8-inch lifts and compact thoroughly.
- B. Granular Material
  - 1. Field compaction shall consist of vibratory plate
  - 2. Obtain 85% relative density (ASTM-4253 and D-4254)
- C. Earth Material
  - 1. Field compaction shall consist of self propelled sheepsfoot or pad foot
  - 2. Obtain 90% standard density (ASTM D-698)

# 3.5 PLACEMENT OF IDENTIFICATION TAPE

- A. Detectable underground marking tape shall be placed over all utility lines. Care shall be taken to insure that the buried marking tape is not broken when installed and shall be Lineguard brand encased aluminum foil, Type III. The identification tape is manufactured by Lineguard, Inc., P.O. Box 426, Wheaton, IL 60187.
- B. The identification tape shall bear the printed identification of the utility line below it, such as "Caution Buried Below". Tape shall be reverse printed; surface printing will not be acceptable. The tape shall be visible in all types and colors of soil and provide maximum color contrast to the soil. The tape shall meet the APWA color code, and shall be 2 inches in width. Colors are: yellow gas, green sewer, red electric, blue sewer, orange telephone, brown force main.
- C. The tape shall be the last equipment installed in the trench so as to be first out. The tape shall be buried 4 to 6 inches below top of grade. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill. The tape may be plowed in after final settlement, installed with a tool during the trench backfilling process, unrolled before final restoration or installed in any other way acceptable to the Owner or Engineer.

#### 3.6 PLACEMENT OF LOCATION WIRE

- A. Detectable underground location wire shall be placed above all non-metallic sewer mains and force mains. Care shall be taken to insure that the buried wire is not broken.
- B. The location wire shall be no smaller than #10 AWG solid copper-coated steel wire with minimum 550 lb. tensile strength or #12 AWG stranded wire, either copper-coated steel or solid copper with minimum 300 lb. tensile strength; each with HDPE insulating jacket. Wire requirements are based on electrical resistance per 1000 foot length. Copper-coated steel wire is preferred to reduce the likelihood of vandalism theft.
- C. The location wire shall be continuous from valve box to valve box and shall be terminated (unconnected) with a wire nut and enough "loose" wire to extend 24 inches outside the valve box.

**END OF SECTION** 

### **SECTION 02446**

### HORIZONTAL DIRECTIONAL DRILLING

### PART 1 - GENERAL

### 1.1 SUMMARY

#### A. Section Includes:

- 1. Labor, materials, machinery, and construction equipment required to construct entry and exit pits and associated shoring and sheeting (actual size and depth to be determined by the Contractor) and perform in a good workmanlike manner all horizontally-controlled directional drilling for the installation of approximately 650 lineal feet of sewage force main under McCool's Creek as indicated on the Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 02732 Sewage Force Mains

## 1.2 QUALITY ASSURANCE

#### A. Referenced Standards:

- 1. American Society for Testing and Materials (ASTM):
  - a. F1962, Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.

## B. Qualifications:

- 1. Directional drilling and pipe installation shall be done only by an experienced Contractor specializing in directional drilling and whose key personnel have at least 5 years experience in this work. Furthermore, the Contractor shall have the following minimum experience:
  - a. Successfully completed a minimum of five (5) HDD installations in the last 5 years that were 36-IN or greater in diameter and 1,000 feet or longer.
  - b. At least three (3) of the projects shall have utilized HDPE.
  - c. At least three (3) of the projects shall have been a water/sewer (river) crossing.

#### 1.3 SUBMITTALS

#### A. Shop Drawings:

- 1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
- 2. Product technical data including:
  - a. Certification from the pipe and fitting manufacturer that all of the materials used to manufacture the pipe and fittings meet the requirements of this specification and the referenced standards.
  - b. Products information, material specifications, material composition, and handling procedures.
  - c. Material safety data sheets and special precautions required.
  - d. Method of mixing and application.
- 3. The Contractor shall prepare and submit a detailed schedule for the work. The schedule shall include all major tasks including, but not limited to, the following:
  - a. Manufacture of HDPE/Fusible PVC pipe and fittings.
  - b. Pipe delivery to the project site.
  - c. Drill rig mobilization and setup.
  - d. Pipe stringout and assembly.
  - e. Beginning and completing the pilot hole drilling.
  - f. Beginning and completing the pre-reaming.
  - g. Beginning and completing the pipe pull-back.
  - h. Hydrostatic pressure testing.
  - i. Disposal of drilling fluids.
  - j. Cleanup, site restoration and demobilization.

- 4. At least 15 days prior to mobilizing drilling equipment, the Contractor shall submit a detailed plan to the Engineer for review. The plan shall include the following:
  - a. Pilot hole drilling procedure, reaming operation, pullback procedure, ballasting, internal gauging, hydrostatic testing, and dewatering procedures.
  - b. Equipment, solids control plant, and pipe string layout plan.
  - c. Calculations showing anticipated maximum pipe stresses during pull-back, required and maximum drilling fluid pressures, and safety factors for potential inadvertent return of drilling fluid due to soil hydrofracture.
    - 1) The calculations shall be sealed by a Professional Engineer.
  - d. Emergency response plan for inadvertent return of drilling fluid.
- 5. It is anticipated that the pipeline will be installed in one continuous length; therefore no pipe joining during pull-back is anticipated. If proposed by the Contractor, such pipe joining must be submitted with full details of methods and performance for approval by the Engineer at least ten (10) days in advanced of proposed operations. Contractor bears sole risk and responsibility for proving the acceptability of such pipe joining and associated work.
- 6. Following completion of the pilot hole drilling, the Contractor shall submit a detailed plan and profile of the bore plotted at a scale no smaller than 1 IN equals 20 FT horizontally and 1 IN equals 10 FT vertically. (The Contractor may make changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points, provided these changes are first submitted in writing and agreed to by the Owner and Engineer.)

### 1.4 COMPLETION OF DIRECTIONAL DRILLING

- A. If a directional drilled pipeline is not successfully installed or the Contractor abandons the effort, he will forfeit all payments for that HDD crossing under this Contract.
- B. Completion and successful testing of the approved pipeline will entitle the Contractor to full payment for the Contract unit price for the HDD crossing, less retainage for site restoration, which sum shall be determined by the Owner, but in no case greater than ten (10) percent of the Contract lump sum price.
- C. In the event of his failure to install the directional drilled pipeline, the Contractor shall retain possession of the HDPE/Fusible PVC pipe and remove it from the site. The bore hole beneath land shall be completely filled with grout or sand to prevent future settlement. If the HDPE/Fusible PVC pipe cannot be withdrawn, it shall be cut off at least 3 feet below the ground and capped with a blind flange. The annular space shall be grouted at the Contractor's expense.

## PART 2 - PRODUCTS

#### 2.1 GENERAL

A. The Contractor shall provide all materials, equipment, and labor for completing the subaqueous crossings and for adequate protection of the Work.

# 2.2 MATERIALS

- A. Refer to Specification Section 15067 for HDPE pipe and tracer wire.
- B. Refer to Specification Section 15065 for Fusible PVC pipe and tracer wire.
- C. Drilling Materials:
  - 1. The drilling materials used by the Contractor to aid in the horizontal drilling operations shall be of the Contractor's choosing. Products shall comply with environmental regulations applicable to this project.
- D. Drilling Fluids:

- 1. Drilling fluids used in the drilling operation shall be a mixture of bentonite and water or such other fluids of the Contractor's choosing.
- 2. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Owner.
- The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

# PART 3 - EXECUTION

#### 3.1 COORDINATION OF WORK

- A. The Contractor shall coordinate his work with the agencies, corporations, and individuals owning or having jurisdiction of land in the project vicinity including, but not necessarily limited to:
  - 1. Corps of Engineers
  - 2. KYTC
- B. The Contractor shall be required to construct test pits to locate existing underground utilities and/or structures in advance of construction. Test pits shall be excavated and backfilled by the Contractor so as not to create a hazardous area. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Owner.
- C. The Contractor shall have the option of securing additional construction easements in different locations if desired to accommodate his construction method. In this case, the Contractor shall notify the Engineer of his intention to secure additional easements. The cost of negotiating and obtaining these easements shall be borne by the Contractor.
- D. Drilling water required for drilling may be purchased from Carroll County Water District or Carrollton Utilities. Contractor is responsible for purchasing, transporting and storing any water required. River or pond water shall not be used for any purpose in the construction. Securing permission to use water from any other source is the responsibility of the Contractor.
  - 1. The Contractor shall coordinate with CU to identify available source points for water. Any source point is subject to the approval of CU.
  - 2. The Contractor shall furnish and install any required backflow preventers, valves and adapters.
  - 3. The quantity of water that the Contractor may use for construction purposes may be limited by flow rate (gallons per minute), time of day, and/or the needs of the water utility, including firefighting.
  - 4. All water for drilling shall be paid for by the Contractor at the water utility's prevailing rates.

#### 3.2 CONSTRUCTION LAYOUT

A. The Contractor shall employ Kentucky licensed land surveyors to locate the positions of the entry and exit points, established elevation and horizontal datum for the borehead control, and layout for the pipe assembly area.

## 3.3 INSTALLATION

#### A. General:

- The Contractor shall install the pipeline under the river and its adjacent banks by the
  horizontally drilled, directionally controlled method of construction. The horizontally
  drilled, directionally controlled method shall consist of the drilling of a small diameter pilot
  hole in a vertical arc from one side of the river to the other followed by an enlarged
  diameter hole for the HDPE pipeline insertion. The exact method and techniques for
  completing the directionally drilled crossing shall be determined by the Contractor, subject
  to the requirements of these Specifications.
- 2. The Contractor shall comply with the applicable portions of ASTM F1962.

# B. Pipe Stringout:

- The Contractor shall elevate the pipe stringout if required, to provide access to private
- 2. The Contractor shall comply with any and all additional restrictions of affected property
- Utilities may be present in the stringout area, and adequate precautions must be taken by the 3. Contractor to prevent damage to the utilities, as required by each utility owner.

#### C. Instrumentation:

- The Contractor will provide and maintain instrumentation which will accurately locate the pilot hole at all times. The Contractor shall provide and use a separate steering system employing a ground survey grid system, such as "TRU-TRACKER" or equal wherever possible.
- The Contractor will provide and maintain instrumentation which will accurately measure drilling fluid flow discharge rate and pressure.
- The Contractor shall provide continuous access to these instruments and their readings to the Owner and Engineer at all times.

#### D. Tolerances:

- 1. HDPE pipe installed by the horizontally drilled directionally controlled method must be located in plan as shown on the Drawings, and must be within the elevation limits shown on the Drawings. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 50 feet. This "as-built" plan and profile shall be updated continuously as the pilot bore is advanced. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to the position or inclination of the pilot bore shall be withheld from the Owner or Engineer. At the completion of the pilot hole, the Contractor shall provide the Engineer with the coordinates of the pilot hole. The entry point location of the pilot hole shall initially penetrate the ground surface at the location shown on the Plan and Profile Drawings. The Contractor will stake this location in the field.
- The Contractor shall make every effort to have the exit point located where shown on the Plans. In no case shall the actual exit point be located farther than 10 feet (along the length of the pipe) from the intended exit point or more than 5 feet on either side perpendicular to the pipe at the exit point location shown. The entire pipe must be within the permanent easement and/or permitted location.
- The alignment of the pilot boring must be such that the pipe can be strung out in a straight line. If the pilot bore fails to conform to the above tolerances, the Engineer may, at his option, require a new pilot boring be made, at no additional cost the Owner. The Contractor will stake this location in the field.
- The Contractor shall at all times handle the high density polyethylene pipe in a manner that does not overstress the pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the Contractor at his expense. The maximum allowable tensile load imposed on the HDPE/FUSIBLE PVC pipe shall be within the limits of the pipe grade and wall section strengths. The Contractor shall be responsible for determining pulling loads required for his method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation. Protect interior and exterior surfaces at all times.

#### E. Entry and Exit Pits:

- Approximate locations of entry and exit pits are shown on the Drawings, subject to the restrictions of the landowners and applicable provisions below:
  - Erosion protection and sediment control BMPs shall be installed in accordance with LMSD and Hardin County Fiscal Court requirements. The BMPs shown on these Drawings are minimum requirements. The Contractor shall implement BMPs to accommodate his sequence and method of construction.
  - Trenching shall be in accordance with Specification Sections 02225.

# 3.4 REAM AND PULL BACK

- A. Prereaming: Prereaming operation shall be conducted at the discretion of the horizontal drilling Contractor. All provisions of this specification relating to simultaneous reaming and pulling back operations shall also pertain to prereaming operations.
- B. Pulling Loads: The Contractor shall be responsible for determining pulling loads required for this method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation.
- C. Torsional Stress: A swivel shall be used to connect the pipeline pull section to the reaming assembly to minimize torsional stress imposed on the section.
- D. Buckling Stress: Contractor shall fill the pipe with clean water, as installation proceeds, as required to prevent buckling and reduce buoyancy.
- E. Pull Section Support: The pull section shall be supported as it proceeds during pull back so that it moves freely and the pipe exterior is not damaged.
- F. Pull Section Length: If space allows, the pull section shall be installed in one continuous length with no tie-in joints. If space is not available, tie-in joints shall be minimized and fully inspected prior to installation.

#### 3.5 OVERPULLING

A. After the high density polyethylene pipeline has been pulled into the reamed pilot hole, the pipe shall be pulled so that at least 3% of the HDD pipeline length is exposed on the end of the bore. The pulling force shall be relieved, and the pipe allowed to "relax" while the pipe is still connected to the pulling head. The Contractor shall allow a time period equal to the total pullback time for the pipe to recover from its elastic strain and visco-elastic stretch, but in no case shall this time be less than 24 hours.

### 3.6 HANDLING OF DRILLING MUD AND CUTTINGS

- A. The HDD operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to nearby waterways. The Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.
- B. The general work areas on the entry and exit sides of the crossings shall be enclosed by a berm to contain unplanned spills or discharge.
- C. Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desilter/desander, centrifuges, material handlers, and haulers, all in a quantity sufficient to perform the cleaning/separating operations without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by Contractor to the extent necessary for legal disposal in off-site landfills. Water from the dewatering process shall be treated by Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.
- D. Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.
- E. Disposal of drilling fluids and cuttings shall be the responsibility of the Contractor and shall be conducted in compliance with all relevant environmental regulations, right-of-way and work space agreements and permit requirements. Bentonite slurry used during the horizontal drilling process shall not be disposed of on-site, but shall be hauled away in watertight trucks to a legal disposal facility. All costs related to disposal shall be borne by the Contractor.

F. Inadvertent drilling fluid returns at locations other than the entry and exit points shall be minimized. Contractor shall immediately clean-up any inadvertent returns.

#### 3.7 TESTING

- A. Leakage Testing:
  - 1. Pre-Test: After all fusing on the strung-out pipeline is completed but prior to installation of the pipe, the Contractor shall conduct a hydrostatic pressure test using the procedure in Specification Section 02610 or a low pressure air test at 3 psi to assure there are no holes or gouges in the pipe.
  - 2. Acceptance Test: After installation, the pipe and fittings shall be hydrostatic pressure tested in place using the procedure in Specification Section 02610.

### B. Pipe Gauging:

- 1. The Contractor shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-roundness, and any other deformations.
- 2. The sizing pig run shall be considered acceptable if the survey results indicate that there are no sharp anomalies (e.g., dents, buckles, gouges, and internal obstructions) greater than 2% of the nominal pipe diameter, or excessive ovality greater than 5% of the nominal pipe diameter.
  - For gauging purposes, dent locations are those defined above which occur within a span
    of five feet or less.
  - b. Pipe ovality shall be measured as the percent difference between the maximum and minimum pipe diameters. For gauging purposes, ovality locations are those defined above which exceed a span of five feet.

#### 3.8 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, existing pipe and appurtenances removed by the Contractor, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operation, and shall leave the entire site of the work in a neat and orderly condition.

#### **END OF SECTION**

### **SECTION 02630**

### **ENCASEMENT PIPE**

### **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install encasement pipe together with all appurtenances as shown and detailed on the Drawings and specified herein.

#### 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities
- B. Section 02732 Sewage Force Mains

#### PART 2 - PRODUCTS

#### 2.1 STEEL PIPE

- A. Steel seamless pipe shall be new Grade B steel material, with a minimum yield of 35,000 psi and a wall thickness as shown below unless otherwise required by a permitting authority. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ARC) Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- B. The minimum wall thickness shall be in accordance with the following table:

### **Steel Casing Pipe Wall Thickness**

Casing Diameter (inches)	(Minimum Wall Thickness Under Railroads (inches)	Minimum Wall Thickness All Other Uses (inches)
16 and under	0.250	0.250

- C. Welds of the steel casing pipe shall be solid butt-welds with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- D. The wall thickness at any point shall be within 12.5% inches of the nominal metal thickness specified.
- E. Hydrostatic testing shall not be necessary.
- F. A protective internal and external coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or Porter International Primer 260FD (red), or an equivalent thickness of an approved equivalent paint shall be applied in the manner recommended by the respective paint manufacturer.
- G. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.
- H. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.

### 2.3 PVC PIPE

A. PVC SDR 17/21 pressure rated pipe with integral bell joints with O-ring seals or PVC SDR 35 pipe conforming to ASTM D 3034 and ASTM F-679.

#### 2.4 CARRIER PIPE SPACERS

- A. Carrier pipes installed inside encasement pipes shall be centered throughout the length of encasement pipe. Centering shall be accomplished by the installation of polyethylene pipeline spacers attached to the carrier pipe in such manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the encasement pipe. Spacers shall be of such dimensions to provide: full supportive load capacity of the pipe and contents; of such thickness to allow installation and/or removal of the pipe; and to allow no greater than ½ inch movement of the carrier pipe within the cover pipe after carrier pipe is installed.
- B. Spacers shall be located immediately behind each bell and at a maximum spacing distance as follows:

Carrier Pipe Diameter (inches)	Maximum Spacing (feet)	
2 - 2-1/2	4	
3 - 8	7	
10 - 26	10	

C. The materials and spacing to be used shall be accepted by the Engineer prior to installation. The polyethylene pipeline spacers shall be manufactured by Pipeline Seal and Insulator, Inc. (PSI), Raci Spacers, Inc., or equivalent. Installation shall be in accordance with manufacturer's recommendations.

# 2.5 ENCASEMENT PIPE END SEALS

After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed with either a wraparound or a pull-on casing end seals fabricated of minimum 1/8-inch thick neoprene rubber. The seals shall be attached to the encasement pipe and the carrier pipe by 304 stainless steel band clamps not less than 1/2-inch wide. The casing end seals shall be as manufactured by Advance Products & Systems, Inc., or approved equivalent.

# **PART 3 - EXECUTION**

### 3.1 INSTALLATION

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Install encasement pipe to maintain alignment, grade and the circular shape of the encasement pipe. The encasement pipe shall be straight and true in alignment; and any significant deviation from line or grade, in the opinion of the Engineer or permitting authority, shall be sufficient cause for disapproving or rejecting the installation.
- B. Two methods of installation are designated, the open-cut method and the boring method.
  - 1. The open-cut method shall consist of placing the encasement pipe in the excavated trench, then installing the carrier pipe inside the encasement pipe. Excavation, bedding and backfilling shall be in accordance with Section 02225.

- 2. The boring and jacking method consists of pushing or jacking the encasement pipe into the subsurface material as an auger cuts out the material or after the auger has completed the bore. Where designated on the drawings, crossings beneath state maintained roads, railroads, or other surfaces not to be disturbed, shall be installed by boring and jacking of steel casing pipe followed by installation of the carrier pipe within the casing pipe. The Contractor shall provide a jacking pit, bore through the earth, and/or rock, jack the casing pipe into proper line and grade and then install the carrier pipe within the casing pipe. The approach trench shall be large enough to accommodate one section of casing pipe, the jacks and blocking. The Contractor shall furnish and use adequate equipment to maintain the line and grade.
- C. The carrier pipe shall be ductile iron, polyvinyl chloride, or polyethylene pipe as designated on the Drawings. The carrier pipe shall be installed using pipe spacers as described in this Section. Carrier pipe will not be permitted to rest on bells or couplings.
- D. Following installation of the carrier pipe, the ends of the encasement pipe shall be sealed with products of the type described in this Section.

#### 3.2 DAMAGE

A. The cost of repairing damage to the highway or railroad which is caused by a boring and jacking installation shall be borne by the Contractor.

# **END OF SECTION**

## **SECTION 02641**

### SEWAGE VALVES

### **PART 1 - GENERAL**

### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install sewage combination air valves together with all appurtenances as shown and detailed on the Drawings and specified herein.

#### 1.2 1RELATED WORK

- A. Section 02225 Excavating, Backfilling and Compacting for Utilities
- B. Section 02732 Sewage Valves

#### 1.3 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer in accordance with the requirements of Section 01300.
- B. The manufacturer shall furnish the Engineer two (2) copies of an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of the latest revision of AWWA C512.
- C. The Engineer shall be furnished two (2) copies of an affidavit that the "Valve Protection Testing" has been done and that all test requirements have been met.

#### PART 2 - PRODUCTS

### 2.1 COMBINATION AIR VALVE

A. Acceptable manufacturers:

1.

- a) A.R.I. Model D-025
- 2) Materials:
  - a) Body and cover: Reinforced Nylon/Stainless Steel SAE 316.
  - b) Float: Foamed Polypropylene.
  - c) Seat: Buna-N.
- 3) Design requirements:
  - a) Size: 2 IN.
  - b) Working pressure: 100 to 140 psi.
  - c) Provide isolation valve, type as shown.
  - d) Flush accessories:
    - (1) Blow-off valve.
    - (2) Clean water inlet valve.
    - (3) Hose and quick connect coupling.

#### 2.2 VALVE BOXES

- A. Non-Traffic Areas each combination air valve shall be installed in plastic meter box with cast iron frame and lid as shown on the drawings.
- B. Traffic Areas each combination air valve shall be installed in a concrete meter box and traffic rated cast iron frame and lid as shown on the drawings.
- C. Covers for valves shall be close fitting and substantially dirt-tight.

# 2.3 FIBERGLASS LINE MARKER FOR BURIED VALVES

#### A. General:

- Design: The continuous fiberglass reinforced composite line marker shall be a single piece
  marker capable of simple, permanent installation by one person using a manual driving tool.
  The marker, upon proper installation, shall resist displacement from wind and vehicle
  impact forces. The marker shall be of a constant flat "T" cross-sectional design with
  reinforcing support ribs incorporated longitudinally along each edge to provide sheeting
  protection and structural rigidity. The bottom end of the marker shall be pointed for ease of
  ground penetration.
- 2. Material: The marker shall be constructed of a durable, UV resistant, continuous glass fiber and marble reinforced, thermosetting composite material which is resistant to impact, ozone, and hydrocarbons within a service temperature range of -40° F to +140° F.
- Workmanship: The marker shall exhibit good workmanship and shall be free of burns, discoloration, cracks, bulges or other objectionable marks which would adversely affect the marker's performance or serviceability.
- 4. Marking: Each marker shall be permanently marked "Sewer Line Below." The letters shall be a minimum of 2 inches in height. A black line shall be stamped horizontally across the front of the marker near the bottom to indicate proper burial depth as shown in the standard detail. The marker shall be a CRM-375 as manufactured by Carsonite International, or approved equivalent.

# B. Physical and Mechanical Requirements:

1. Dimensions: The marker shall conform to the shape and overall dimensions shown in the standard detail.

Property	ASTM Test Method	Minimum Value
Ultimate Tensile Strength	D-638	50,000 psi
Ultimate Compressive Strength	D-638	45,000 psi
Specific Gravity	D-792	1.7
Weight % Glass Reinforcement	D-2584	50%
Barcol Hardness	D-2583	47

- Mechanical Properties: The marker shall have the minimum mechanical properties as follows:
- 3. Color Fastness: The marker shall be pigmented throughout the entire cross-section so as to produce a uniform color which is an integral part of the material. Ultraviolet resistant materials shall be incorporated in the construction to inhibit fading or cracking of the delineator upon field exposure.
- 4. Vehicle Impact Resistance: The marker shall be capable of self-erecting and remain functional after being subjected to a series of ten head on impacts by a typical passenger sedan at 35 miles per hour. The marker shall retain a minimum of 60 percent of its sheeting.

#### C. Reflectors:

- 1. The reflector shall be of impact resistant, pressure sensitive retro-reflective sheeting which shall be subject to approval by the Engineer. The sheeting shall be of appropriate color to meet MUTCD requirements.
- 2. Mounting: The retro-reflective sheeting shall consist of a minimum of a 3-inch wide strip placed a maximum of 2 inches from the top of the post unless otherwise specified.

# **PART 3 - EXECUTION**

### 3.1 INSTALLATION

- A. Combination air valves shall be installed as nearly as possible in the positions indicated on the Drawings. All valves shall be carefully erected and supported in their respective positions free from all distortion and strain on appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and material, all debris and foreign material cleaned out of valve openings and seats, all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness.

### 3.2 FIELD QUALITY CONTROL

- A. Clean, inspect, and operate valve to ensure all parts are operable and valve seats properly.
- B. Check and adjust valves and accessories in accordance with manufacturer's instructions and place into operation.

# **END OF SECTION**

### **SECTION 02732**

### SEWAGE FORCE MAIN

# **PART 1 - GENERAL**

#### 1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, material, and equipment necessary to install force main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

### 1.2 RELATED WORK

- A. Section 02225 Excavating, Backfilling, and Compacting for Utilities.
- B. Section 02630 Encasement Pipe.

### PART 2 - PRODUCTS

#### 2.1 POLYVINYL CHLORIDE (PVC) FORCE MAIN PIPE

- A. Polyvinyl chloride (PVC) pipe for force mains shall be PVC SDR 21pressure rated pipe with integral bell joints with rubber O-ring seals.
- B. All PVC pipe shall conform to the latest revisions of ASTM D-1784 (PVC Compounds), ASTM D-2241 (PVC Plastic Pipe, SDR) and ASTM D-2672 (Bell End PVC Pipe). PVC pipe shall have a minimum cell classification of 12454B or 12454C ad defined in ASTM D-1784. Rubber gasketed joints shall conform to ASTM D-3139. The gaskets for the PVC pipe joint shall conform to ASTM F-477 and D-1869.
- C. Fittings for all lines 4 inches in diameter or larger shall be 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. Cement mortar lining and seal coating shall be in accordance with ANSI/AWWA C104/A21.4. Bituminous outside coating shall be in accordance with ANSI/AWWA C110/A21.10. All fittings shall be rated at 250 psi sewer working pressure plus sewer hammer and be ductile cast-iron grade 70-50-05 per ASTM Specification A339.
- D. All pipe and couplings shall bear identification markings that will remain legible during normal handling, storage and installation, which have been applied in a manner what will not reduce the strength of the pipe or the coupling or otherwise damage them. Pipe and coupling markings shall include the nominal size and OD base, material code designation, dimension ratio number, ASTM Pressure Class, ASTM designation number for this standard, manufacturer's name or trademark, seal (mark) of the testing agency that verified the suitability of the pipe material for sanitary sewer service. Each marking shall be applied at intervals of not more than 5 feet for the pipe and shall be marked on each coupling.

### 2.2 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

# A. General:

- Provide PE 3408 HDPE piping with fittings and appurtenances to locations shown on Drawings.
- 2. All HDPE pipe shall conform to ASTM F714. All HDPE pipe and fittings shall be the product of single manufacturer.

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- 3. Provide DR 11 6-IN IPS/DIPS pipe with a minimum wall thickness of 3.273 IN for pipe and fittings.
- 4. Fittings (bends and reducing tees) shall be fabricated from HDPE pipe of a compound matching the compound used in the pipe manufacturing. Mitered bends shall be fabrication as follows:
  - a. 45-degree bends shall be fabricated with three (3) segments with 22.5-degree miter angles.
  - b. Bends with a 22.5-degree and below shall be constructed of two (2) segments.

# B. HDPE Pipe and Fittings

1. Shall be manufactured in accordance with AWWA C906. Materials used for manufacturing the polyethylene pipe and fittings shall be PE 4710 HDPE meeting ASTM D3350 cell classification of PE 445474C, as specified in the following table:

Cell Classification	Property	Test Method	Cell Classification Limits	Units
4	Density	ASTM D1505	0.947 to 955	g/cm <sup>3</sup>
4	Melt Index	ASTM D1238	less than < 0.15	gm/10 min
5	Flexural Modulus	ASTM D790	110,000 to 160,000	psi
5	Tensile Strength	ASTM D638	3,500 to 4,000	psi
7	Slow Crack Growth (ESCR)	ASTM D1693	greater than 5,000 (in 100% Igepal solution)	hours
	Slow Crack Growth (PENT)	ASTM F1473	greater than 500	hours
4	HDB (at 73 DegF)	ASTM D2837	1,600	psi
С	UV Stabilizer	ASTM D1603	2 to 2.5%	carbon-black content by weight

- 2. The material shall a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73 DegF when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe manufacturer in PPI TR-4.
- 3. Identify each length of pipe clearly at intervals of 5 FT or less.
  - a. Name and/or trademark of the pipe manufacturer.
  - b. Nominal size of pipe.
  - c. Dimension ratio.
  - d. The letters PE followed by the polyethylene grade in accordance with ASTM D1248 followed by the hydrostatic design basis.
  - e. Manufacturing standard reference (e.g. ASTM F714).
  - f. A production code from which the date and place of manufacture can be determined.
  - g. NSF Approval.

#### 2.3 FIBERGLASS LINE MARKER

#### A. General:

 Design: The continuous fiberglass reinforced composite line marker shall be a single piece marker capable of simple, permanent installation by one person using a manual driving tool. The marker, upon proper installation, shall resist displacement from wind and vehicle

- impact forces. The marker shall be of a constant flat "T" cross-sectional design with reinforcing support ribs incorporated longitudinally along each edge to provide sheeting protection and structural rigidity. The bottom end of the marker shall be pointed for ease of ground penetration.
- 2. Material: The marker shall be constructed of a durable, UV resistant, continuous glass fiber and marble reinforced, thermosetting composite material which is resistant to impact, ozone, and hydrocarbons within a service temperature range of  $-40^{\circ}$  F to  $+140^{\circ}$  F.
- 3. Workmanship: The marker shall exhibit good workmanship and shall be free of burns, discoloration, cracks, bulges or other objectionable marks which would adversely affect the marker's performance or serviceability.
- 4. Marking: Each marker shall be permanently marked "Sewer Line Below." The letters shall be a minimum of 2 inches in height. A black line shall be stamped horizontally across the front of the marker near the bottom to indicate proper burial depth as shown in the standard detail. The marker shall be a CRM-375 as manufactured by Carsonite International, or approved equivalent.

## B. Physical and Mechanical Requirements:

- 1. Dimensions: The marker shall conform to the shape and overall dimensions shown in the standard detail.
- 2. Mechanical Properties: The marker shall have the minimum mechanical properties as follows:

Property	ASTM Test Method	Minimum Value
Ultimate Tensile Strength	D-638	50,000 psi
Ultimate Compressive Strength	D-638	45,000 psi
Specific Gravity	D-792	1.7
Weight % Glass Reinforcement	D-2584	50%
Barcol Hardness	D-2583	47

- 3. Color Fastness: The marker shall be pigmented throughout the entire cross-section so as to produce a uniform color which is an integral part of the material. Ultraviolet resistant materials shall be incorporated in the construction to inhibit fading or cracking of the delineator upon field exposure.
- 4. Vehicle Impact Resistance: The marker shall be capable of self-erecting and remain functional after being subjected to a series of ten head on impacts by a typical passenger sedan at 35 miles per hour. The marker shall retain a minimum of 60 percent of its sheeting.

## C. Reflectors:

- 1. The reflector shall be of impact resistant, pressure sensitive retro-reflective sheeting which shall be subject to approval by the Engineer. The sheeting shall be of appropriate color to meet MUTCD requirements.
- 2. Mounting: The retro-reflective sheeting shall consist of a minimum of a 3-inch wide strip placed a maximum of 2 inches from the top of the post unless otherwise specified.

### PART 3 - EXECUTION

# 3.1 LAYING DEPTHS

A. In general, force mains shall be laid with a minimum cover of 48 inches, except as otherwise indicated on the Drawings.

# 3.2 SEWER PIPE CROSSING CONCRETE ENCASEMENT

- A. At locations shown on the Drawings, required by the Specifications, or as directed by the Engineer, steel encasement pipe or concrete encasement shall be used when the clearance between the proposed sewage force main and any existing sewer pipe is 18 inches or less.
- B. Whether the proposed sewage force main is above or below the existing sewer pipe, if concrete encasement is utilized, the concrete encasement shall fully encase the sewer pipe and extend to the spring line of the sewer pipe. Concrete encasement or steel encasement pipe shall extend in each direction along the sewer pipe until the encased sewer pipe is 10 feet from the sewer pipe, measured perpendicular to the sewer pipe.
- C. Concrete shall be 3000 psi and shall be mixed sufficiently wet to permit it to flow between and under pipes to form a continuous bridge. In tamping the concrete, care shall be taken not to disturb the grade or line of either pipe or damage the joints. Steel encasement pipe shall meet the requirements of Section 02630.

### 3.3 PIPE LAYING - PVC PIPE

- A. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the Drawings. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
- B. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to insure it being clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
- C. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.

### D. Anchorage of Bends:

- 1. At all tees, plugs, caps and bends of 11-1/4 degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by using suitable harness, thrust blocks or ballast. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of concrete being provided; however care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair.
- 2. Bridles, harness or pipe ballasting shall meet with the approval of the Engineer. Steel rods and clamps shall be galvanized or otherwise rust-proofed or painted.
- 3. No extra pay shall be allowed for work on proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.

### 3.4 PIPE LAYING – HDPE PIPE

# A. GENERAL

- 1. HDPE pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings, and as specified herein.
- 2. Care shall be taken in loading, transporting, and unloading to prevent damage to the pipe. Pipe shall not be dropped. All pipe shall be examined before installation and no pipe shall be installed that is found to be defective.

- 3. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipe. Chains, cables, or hooks shall not be used.
- 4. Pipe shall be stored on level ground free of sharp objects that could damage the pipe. Stacking of the pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipe in the anticipated temperature conditions. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

# B. INSTALLATION

- 1. Joining Procedures:
  - Joining method of the pipe and fittings shall be the butt fusion method in accordance with ASTM D3261 and ASTM F2620.
  - b. All joint fusion shall be performed in accordance with the joining equipment and HDPE pipe manufacturer's recommendations.
  - c. All fusion equipment must be approved by the HDPE pipe manufacturer and operated by operators certified by the HDPE pipe manufacturer.
  - d. Fusion joiner must be qualified by type of fusion (e.g. butt fusion) and fuse pipe only as qualified.
  - e. Cost for testing and certifying personnel shall be born by the Contractor.
  - f. Fuse HDPE joints on the surface prior to installation. Each joint must be visually inspected inside and outside for damage, dirt, moisture, or any other abnormalities prior to fusing.

#### 3.5 TRACER WIRE

- A. All pipe shall be installed with a tracer wire for pipeline location purposes by means of an electronic line tracer.
- B. The wires shall be installed along the entire length of the pipe.
- C. Sections of wire shall be spliced together using approved splice caps and sewerproof seals. Twisting the wires together is not acceptable.

# 3.6 FIELD QUALITY CONTROL (HDPE PIPE)

- A. Fusion reports shall be submitted for each fusion joint performed on the project, including any joints that are rejected. The reports shall include the following:
  - 1. Pipe size and DR.
  - 2. Fusion equipment size and identification.
  - 3. Fusion technician identification.
  - 4. Job identification number.
  - 5. Fusion number and joining parameters.
  - 6. Ambient temperature.

#### 3.7 TESTING OF FORCE MAINS

- A. The completed work shall comply with the provisions listed herein, or similar requirements which will insure equal or better results. Suitable test plugs, sewer pump or other equipment and apparatus, and all labor required to properly conduct the tests shall be furnished by the Contractor at no expense to the Owner.
- B. Force main piping shall be pressure tested to 250 percent of the normal system operating pressure or to 100 percent of the rated pressure of the pipe, whichever is less. At no time shall the test pressure exceed 100 percent of the pipe's rated pressure. A pipe section shall be accepted if the test pressure does not fall more than 5 percent during the 4-hour period.

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C. All piping shall be tested for leakage at a pressure no less than that specified for the pressure test. The leakage shall be less than an allowable amount determined by the following equation:

$$L = \frac{ND (P)^{1/2}}{7,400}$$

Where: L = allowable leakage (gallon/hour)

N = number of joints in length of pipeline tested

D = nominal diameter of pipe (inches)

P = test pressure (psig)

- D. Should the sections under test fail to meet the requirements, the Contractor shall do all work locating and repairing the leaks and retesting as the Engineer may require without additional compensation.
- E. If in the judgment of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

# **END OF SECTION**

### **SECTION 02735**

# PRECAST CONCRETE MANHOLE STRUCTURES

# PART 1 - GENERAL

#### 1.1 SUMMARY

#### A. Section Includes:

- 1. Precast concrete manhole structures and appurtenant items.
  - a. Sanitary sewer manholes and appurtenances.
- B. Related Specification Sections include but are not necessarily limited to:
  - . Section 02225 Trenching, Backfilling, and Compacting for Utilities.
  - 2. Section 03300 Cast-In-Place Concrete

### 1.2 QUALITY ASSURANCE

#### A. Referenced Standards:

- 1. ASTM International (ASTM):
  - a. A48/A48M, Standard Specification for Gray Iron Castings.
  - b. C150/C150M, Standard Specification for Portland Cement.
  - c. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - d. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
  - e. D1227, Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
  - f. D4586, Standard Specification for Asphalt Roof Cement, Asbestos-Free.

### 1.3 SUBMITTALS

### A. Shop Drawings:

- 1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.
- 2. Product technical data including:
  - a. Acknowledgement that products submitted meet requirements of standards referenced.
  - b. Manufacturer's installation instructions.
- 3. Fabrication and/or layout drawings:
  - a. Include detailed diagrams of manholes showing typical components and dimensions, reinforcements and other details.
  - b. Itemize, on separate schedule, sectional breakdown of each manhole structure with all components and refer to drawing identification number or notation.
  - c. Indicate knockout elevations for all piping entering each manhole.
- B. Unless approved prior to submittal, submit all products from this Specification Section in one complete submittal package. Include all products and accessories together.

### PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
  - 1. Manhole rings, covers and frames:
    - a. Neenah Foundry and Neenah Enterprises, Inc.
    - b. Deeter Foundry.
  - 2. Black mastic joint compound:
    - a. Kalktite 340.

- b. Tufflex.
- c. Plastico.
- 3. Premolded joint compound:
  - a. RAM-NEK.
  - b. Kent Seal.
- 4. Emulsified fibrated asphalt compound:
  - a. Sonneborn Hydrocide 700B.

### 2.2 SANITARY SEWER MANHOLE STRUCTURE COMPONENTS

# A. Manhole Components:

- 1. Reinforcement: ASTM C478.
- 2. Minimum wall thickness: 5 IN.
- 3. Minimum base thickness: 12 IN.
- 4. Provide the following components for each manhole structure:
  - a. Base (precast) with integral bottom section or (cast-in-place).
  - b. Precast bottom section(s).
  - c. Precast barrel section(s).
  - d. Precast eccentric transition section.
  - e. Precast adjuster ring(s).
  - f. Precast concrete transition section.
  - g. Precast flat top.
- Unless dimensioned or specifically noted on Drawings, provide manhole section with minimum 48 IN inside dimensions.

#### B. Nonpressure Type Frames and Cover:

- 1. Cast iron frame and covers: ASTM A48/A48M, Class 35 (minimum).
- 2. Use only cast {ductile} iron of best quality, free from imperfections and blow holes.
- 3. Furnish frame and cover of heavy-duty construction a minimum total weight of 450 LBS.
- 4. Machine all horizontal surfaces.
- 5. Furnish unit with solid nonventilated lid with concealed pickholes.
  - a. Letter covers "SEWER" for all collection system manholes
- 6. Ensure minimum clear opening of 24 IN DIA.

#### C. Pressure Type Frame and Cover:

- 1. Provide covers meeting the requirements of the Nonpressure Type Frames and Cover paragraph above and as modified below.
- 2. Furnish frame and bolted cover of heavy-duty construction.
  - a. Equip unit with six (6) stainless steel countersunk 3/8 IN DIA by 1-1/2 IN long bolts with stainless steel washers.
- 3. Provide solid lid and minimum 1/8 IN thick x 1/2 IN wide continuous strip neoprene gasket.
- 4. Furnish unit with a minimum of six (6) anchorage holes and six (6) 6 IN long x 3/4 IN DIA stainless steel anchor bolts.

# D. Sanitary Sewer Manhole Concrete:

- Provide all sanitary manholes constructed with Portland ASTM C150/C150M, Type I or II cement with a tricalcium aluminate content not to exceed 8 percent.
- 2. Mix aggregate shall be a minimum of 50 percent crushed limestone.
- 3. Provide 3000 psi nonshrink grout.

### PART 3 - EXECUTION

#### 3.1 MANHOLE CONSTRUCTION

#### A. General:

- 1. Construct cast-in-place concrete base slabs.
- Make inverts with a semi-circular bottom conforming to the inside contour of the adjacent sewer sections.
- 3. On all straight runs, lay pipe through manhole and cut out top half of pipe.

- a. See detail on Drawings.
- b. If pipes deflect at manhole, shape as specified in Paragraphs 2 and 4 in this General Paragraph.
- 4. Shape inverts accurately and steel trowel finish.
  - a. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert using as large a radius as manhole inside diameter will permit.
  - b. Pour base slab integral with bottom barrel section.
- B. Build each manhole to dimensions shown on plans and at such elevation that pipe sections built into wall of manhole will be true extensions of line of pipe.
- C. For all horizontal mating surfaces between concrete and concrete or concrete and metal, above established high groundwater elevation shown trowel apply to clean surface black mastic joint compound to a minimum wet thickness of 1/4 IN immediately prior to mating the surfaces.
- D. For horizontal joints that fall below established high groundwater elevation shown, install a resilient O-ring type gasket or pre-molded joint compound.
- E. Seal all pipe penetrations in manhole.
  - 1. Form pipe openings smooth and well shaped.
  - 2. After installation, seal cracks with, non shrink grout.
  - 3. After grout cures, wire brush smooth and apply two coats emulsified fibrated asphalt compound to minimum wet thickness of 1/8 IN to ensure complete seal.
- F. Set and adjust frame and cover final 6 IN (minimum) to 18 IN (maximum) to match finished pavement or finished grade elevation using precast adjuster rings.

# **END OF SECTION**

### **SECTION 03300**

# **CAST-IN-PLACE CONCRETE**

# **PART 1 - GENERAL**

#### 1.1 WORK INCLUDED

- A. Formwork.
- B. Reinforcing Steel.
- C. Expansion and Contraction Joints.
- D. Waterstops
- E. Concrete.

### 1.2 RELATED REQUIREMENTS

- A. Section 00710 General Conditions.
- B. Section 02225 Excavation, Backfilling and Compacting for Utilities.

#### 1.3 REFERENCES

- A. ACI 350R Environmental Engineering Concrete Structures.
- B. ACI318 Building Code Requirements for Reinforced Concrete.
- C. ACI347 Recommended Practice for Concrete Formwork.
- D. CRSI Manual of Standard Practice.
- E. CRSI Placing Reinforcing Bars.
- F. ASTM A-615, A-120, A-185, C-31, C-39

#### 1.4 SUBMITTALS

- A. The Contractor shall submit the following data to the Engineer for review:
  - 1. Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
  - 2. Certification by the manufacturer that cement meets the Specification contained herein.
  - 3. Shop drawing for reinforcing steel showing bar schedules, location, and splices.
  - 4. Reports on laboratory compression tests of cylinders taken during concrete placement.
  - 5. Manufacturer's cut sheets for all other concrete related products.

# PART 2 - PRODUCTS

## 2.1 CLASSES OF CONCRETE AND USAGE

- A. Structural concrete of the various classes required shall be proportioned to produce the following 28-day compressive strengths:
  - 1. Selection of Proportions for 4,500 psi Concrete:
    - a. 4,500 psi compressive for strength at 28 days.
    - b. Type I/II cement plus air.
    - c. Maximum water/cement ratio 0.42.
    - d. Minimum cement content 564 lbs. (6.0 bags)/cubic yard concrete.
    - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).

- f. Air content 5% plus or minus 1% by volume.
- g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture. Additional slump is allowed by use of water reducing or superplasticizing admixtures.
- 2. Selection of Proportions for 3,000 psi Concrete:
  - a. 3,000 psi compressive strength at 28 days.
  - b. Type I/II cement plus air.
  - c. Maximum water/cement ratio 0.56.
  - d. Minimum cement content 470 lbs. (5.0 bags)/cubic yard concrete.
  - e. Nominal maximum size coarse aggregate No. 67 (3/4-inch maximum) or No. 57 (1-inch maximum).
  - f. Air content 5% plus or minus 1% by volume.
  - g. Slump 4 inches in accordance with ASTM C-143, when measured with only an air entraining admixture.
- B. Concrete shall be used as follows:
  - 1. 4,500 psi concrete for all concrete work except as noted below.
  - 2. 3,000 psi concrete for encasement of piping where indicated, and thrust blocking.
- C. All testing of aggregates and determination of proportions shall be or have been performed by a recognized independent testing laboratory.
- D. Cement for exposed concrete shall have a uniform color classification.
- E. Type I/II cement conforming to ASTM C-150 shall be used in all concrete.
- F. Coarse aggregate shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amount of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to all requirements of ASTM C-33.
- G. Fine aggregates shall be natural sand having clean, hard, uncoated grains, free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33.
- H. Water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

#### 2.2 ADMIXTURES

- A. An air entraining admixture shall be used on all concrete and shall be the neutralized vinsol resin type such as Master Builders MB-VR, Euclid Chemical Company AIR-MIX or equivalent. The admixture shall meet the requirements of ASTM C-260.
- B. Other admixtures (water reducing agents, acellerating agents, retarding agents, superplasticizing agents) shall be considered where necessary to meet the needs of construction.
- C. Admixtures shall be used in concrete design mixes in the same manner and proportions as in the field so that the effects of the admixtures are included in preliminary test submitted to the Engineer for review prior to the start of construction.

### 2.3 REINFORCEMENT

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615. All bar reinforcement shall be deformed.
- B. Welded wire fabric shall conform to ASTM A-185 and shall be of weight and gauge as indicated on the Drawings.

C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high-density polyethylene tips so that the metal portion shall be at least one-quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

#### 2.4 FORMS

- A. Forms shall be of suitable material, design, and construction so as to be rigid, tight enough to prevent the passage of mortar, and plane surfaces with a tolerance of 1/16-inch in 4 feet.
- B. For surfaces to be given burlap-rubbed finish, the form surface in contact with the concrete shall be made of heavy gauge metal, new plywood (used plywood which, in the opinion of the Engineer, is substantially equal to new plywood may be used), tempered wood fiberboards with smooth surface, or similar materials. Metal forms or form linings shall have square edges so that the concrete will not have fins or fluting. Forms shall not be pieced out by use of materials different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface.
- C. For surfaces other than those to be given burlap-rubbed finish, forms shall be made of wood, metal, or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be reasonable good, as accepted. Metal forms shall be of an acceptable type for the work involved. Edges of forms in contact with concrete shall be flush within 1/16-inch.
- D. Form for walls, columns, or piers shall have removable panels at the bottom for cleaning, inspection, and scrubbing-in of bonding grout. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete, and so that construction joints can be properly keyed and treated.
- E. Forms for exposed surfaces shall be built with 3/4-inch chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.
- F. Form ties to be encased in concrete shall not be made of through-bolts or common wire, but shall be of a well-established type, so made and installed as to embody the following features:
  - 1. After removal of the protruding part of the tie, there shall be no metal nearer than 1 inch to the face of the concrete.
  - 2. That part of the tie which is to be removed shall be at least 1/2-inch in diameter, or if smaller, it shall be provided with a wood or metal cone 1 inch long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
  - 3. Ties which pass through walls subject to hydrostatic pressure shall be provided with acceptable water stops, such as washers, securely fastened to the ties.

## 2.5 OTHER MATERIALS

- A. Anchorage items shall be of standard manufacture and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the Engineer.
- B. Premolded expansion-joint filler strips shall conform to ASTM D-1752 and shall be 3/8-inch thick unless otherwise shown.
- C. Joint sealants shall conform to ANSI 116.1. The following joint sealants are acceptable:
  - 1. Colma by Sika Corporation.
  - 2. Hornflex by A. C. Horn, Inc.
  - 3. Sonolastic by Sonneborn Division of Contech, Inc.

#### D. Grout:

- 1. Precision-support grout shall consist of a non-shrink, ready-to-use, precision grout material; proportioned, pre-mixed and packaged at the factory; delivered to the job site to place with only the addition of water; forming, placing and curing as stipulated by the manufacturer.
- 2. Grouts which depend upon aluminum powders, chemicals, or other agents which produce gas for expansion are not acceptable.
- 3. Precision-support grout shall also meet the following requirements:
  - a. Free of gas producing agents.
  - b. Free of oxidizing catalysts.
  - c. Free of inorganic accelerators, including chlorides.

### E. Construction Joint Waterstops:

- 1. Polyvinylchloride (PVC) Waterstops:
  - a. Provide PVC waterstops complying with Corps of Engineers CRD-C572.
  - b. Provide serrated type with a minimum thickness of 3/8 inch by a minimum width of 6 inches may be provided in specific applications as approved by the ENGINEER.
  - c. Provide PVC waterstops as manufactured by Greenstreak Plastic Products company; Vinylex Corporation, or equivalent product.
- 2. Adhesive Waterstop:
  - a. Provide pre-formed adhesive waterstop in construction joint locations where shown, or as alternative to PVC waterstop where appropriate.
  - b. The preformed waterstop shall meet or exceed all requirements of Federal Specifications SS-S-210A, "Sealing Compounds for Expansion Joints".
  - c. Provide adhesive waterstops as manufactured by Synko-Flex Products, Division of Henry Products, Inc.; or equivalent product.
- 3. Hydrophilic Waterstops:
  - a. Hydrophilic waterstop may be used as an alternate to the adhesive waterstop.
  - b. Provide waterstops as manufactured by Greenstreak Plastic Products Company; Adeka, Inc.; or equivalent product.
- F. Membrane Forming Curing compound: ASTM C 309, Type I-D.
  - 1. Provide without fugitive dye when requested by Engineer.
- G. Epoxy Bonding Agent: Provide two-component epoxy resin bonding agent as manufactured by Sika Chemical Corporation; A.C. Horn, Incorporated; or equivalent product.

## H. Adhesive Dowels:

- 1. Drilling equipment used and installation of adhesive dowels shall be in accordance with manufacturer's instructions.
- 2. Assure that embedded items are protected from damage and are not filled in with concrete.
- 3. Unless otherwise shown or approved by Engineer, embedment depths shall be based on a compressive strength of 2,500 psi when embedded into existing concrete.)
- 4. The Contractor shall comply with the adhesive material manufacturer's installation instructions on the hole diameter. The Contractor shall properly clean out the hole utilizing a synthetic brush and compressed air to remove all loose material from the hole, prior to installing adhesive capsules or material. Proper mixing of the two-component system shall be done to the manufacturer's recommendations.
- 5. Adhesive material manufacturer's representative shall observe and demonstrate the proper installation procedures for the adhesive dowels and adhesive material at no additional expense to the Owner. Each installer shall be certified in writing by the manufacturer to be qualified to install the adhesive dowels.
- 6. Provide two-component dowel installation adhesive as manufactured by Hilti Corporation, or approved equivalent product.

# PART 3 - EXECUTION

#### 3.1 FORMING

- A. Forms shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions and to the elevations indicated on the Drawings or specified, and exposed concrete will be substantially free from board or grain marks, poorly matched joints, and other irregularities or defects.
- B. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- C. All falsework to support structural slabs, beams, girders, etc., shall be designed to safely and adequately support the concrete and forms during placement and curing. The adequacy and safety of the falsework shall be the sole responsibility of the Contractor.
- D. All forms shall be oiled with an acceptable nonstaining oil or liquid form coating before reinforcement is placed.
- E. Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.
- F. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of days-degrees \*:
  - 1. Beams and slabs: 500 day-degrees.
  - 2. Walls and vertical surfaces: 100 day-degrees.
  - 3. \*Day-degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily average temperature of 60 degrees F, equals 300 day-degrees.
- G. Shores under beams and slabs shall not be removed until the concrete has attained at least 60 percent of the specified compressive strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

### 3.2 PLACING REINFORCEMENT

- A. Reinforcement shall be bent cold to the dimensions and shapes shown on the Drawings and within tolerances specified in the CRSI Manual of Standard Practice.
- B. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- C. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- D. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- E. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- F. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

### 3.3 TESTING AGGREGATES AND DETERMINING PROPORTIONS

- A. No concrete shall be used in the work until the materials and mix design have been accepted by the Engineer.
- B. The conformity of aggregates to the Specifications hereinbefore given shall be demonstrated and determined by tests per ASTM C-33 made with representative samples of the materials to be used on the work.
- C. The actual proportions of cement, aggregates, admixtures and water necessary to produce concrete conforming to the requirements set forth herein shall be determined by making test cylinders using representative samples of the materials to be used in the work. A set of four standard 6-inch cylinders shall be made and cured per ASTM C-31. Two shall be tested at 7 days and two at 28 days per ASTM C-39. The slump shall not be less than the greatest slump expected to be used in the work.
- D. Reports on the tests and a statement of the proportions proposed for the concrete mixture, shall be submitted in triplicate to the Engineer for review as soon as possible, but not less than five days prior to the proposed beginning of the concrete work. If the Contractor furnishes in writing, similar, reliable detailed information from an acceptable source, and of date not more than four months prior to the time when concrete will be used on this project, the above requirements for laboratory test may be modified by the Engineer. Such data shall derive from mixtures containing constituents, including the admixtures where used, of the same types and from the same sources as will be used on this project.
- E. The Engineer shall have the right to make check tests of aggregates and concrete, using the same materials, and to order changes as may be necessary to meet the specified requirements.
- F. The Contractor may request permission to add water at the job site; and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case shall the total water per bag of cement exceed the ratio set forth herein.
- G. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

### 3.4 MIXING

- A. All central-plant and rolling-stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Association, as well as the ACI Standards for measuring, Mixing and Placing Concrete (ACI 614), and with the ASTM Standard Specification for Ready-Mixed Concrete, Designation C94, insofar as applicable.
- B. Ready-mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.
- C. Central-mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch, and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the premixed concrete is placed in the truck and shall continue without interruption until discharge. For transit-mixed concrete the major portion of the mixing water shall be added and mixing started immediately after the truck is charged.
- D. The amount of water initially added shall be recorded on the delivery slip for the Engineer's information; no additional water shall be added, either in transit or at the site, except as directed. Mixing (at mixing speed) shall be continued for at least 10 minutes followed by agitation without interruption until discharge. Concrete shall be discharged at the site within 1-1/2 hours

- after water was first added to the mix, and shall be mixed at least 5 minutes after all water has been added.
- E. Concrete which has become compacted or segregated during transportation to or in the site of the work shall be satisfactorily remixed just prior to being placed in the forms.
- F. Partially hardened concrete shall not be deposited in the forms. The retempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

# 3.5 COMPRESSION TESTS

- A. During the progress of the work, at least one (1) set of four (4) compression test cylinders shall be made for each 50 cubic yards of concrete or major fraction thereof, and not less than one such set for each type of concrete for each day's pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, Designation C31, except that wherever possible molds shall be left on the cylinders until they have reached the laboratory. Testing services to satisfy the requirements of ACI shall be paid for by the Contractor at his expense. Testing lab must be approved by the Engineer.
- B. One cylinder of each set shall be broken in accordance with ASTM C-39 at seven (7) days and the other two at twenty-eight (28) days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.
- C. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.

#### 3.6 METALWORK IN CONCRETE

- A. All trades shall be notified, at the proper time, to install items to be embedded in concrete.
- B. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed, and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed.
- C. Anchor bolts shall be set by means of substantial templates.

### 3.7 PLACING AND COMPACTING CONCRETE

- A. At least twenty-four (24) hours before the Contractor proposes to make any placement of concrete, he shall notify the Engineer of his intention and planned procedure. Unless otherwise permitted, the work shall be so executed that a section begun an any day shall be completed during daylight of the same day.
- B. No concrete shall be placed until the subgrade has been accepted in accordance with the requirements of Section 01400, Quality Control, nor shall it be placed on frozen subgrade or in water. Placement of concrete shall not be scheduled until the forms, reinforcing, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free form rust, scale, oil, or any other foreign matter.
- C. Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thorough wetted just prior to placement of concrete.
- D. Concrete placed at air temperatures below 40 degrees shall have a minimum temperature of 50 degrees F. and a maximum of 70 degrees F. when placed.
- E. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable and by methods which will prevent separation of ingredients and avoid rehandling.

- F. Chutes for conveying concrete shall be metal or metal-lined and of such size, design, and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall be not flatter than 1 on 2 and all parts of a chute shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or, if required, a spout; and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.
- G. In thin sections of considerable height (such as walls and columns), concrete shall be placed in such a manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, etc., shall be used as required or permitted unless the forms are provided with suitable openings.
- H. Chutes, hoppers, spouts, etc., shall be thoroughly cleaned before and after each run and the water and debris shall not be discharge inside the form.
- I. For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain, until the completion of the unit, an approximately horizontal, plastic surface.
- J. No wooden spreaders shall be left in the concrete.
- K. During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal-type mechanical vibrators operating at not less than 5,000 rpm., or other tool spading, to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried on in such a manner and only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface, shall be avoided.
- L. The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

### 3.8 BONDING CONCRETE AT CONSTRUCTION JOINTS

- A. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any, and then roughened.
- B. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which all pools shall be removed. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be 1/8-inch thick on vertical surfaces and 1/4-inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

## 3.9 CURING AND PROTECTION

A. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slab, etc., shall be ponded to a depth of 1/2-inch wherever practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.

- B. For at least seven (7) days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F.
  - 1. No manure, salt, or other chemicals shall be used for protection.
  - 2. Wherever practicable, finished slabs shall be protected form the direct rays of the sun to prevent checking and crazing.

#### 3.10 TRIMMING AND REPAIRS

- A. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.
- B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired.
- C. Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but less than 1 inch deep. The remaining concrete shall be thoroughly roughened and cleaned. Concrete around the cavity or the form-tie recess shall be thoroughly wetted and promptly painted with a 1/16-inch brush coat of neat cement mixed to the consistency of lead paint. The hole shall then be filled with mortar.
  - 1. Mortar shall be 1:1-1/2 cement and sand mix with sufficient white cement, or fine limestone screenings in lieu of sand, to produce a surface matching the adjoining work. Cement and sand shall be from the same sources as in the parent concrete.
  - 2. For filling form-tie recesses, the mortar shall be mixed slightly damp to the touch (just short of "balling"), hammered into the recess until it is dense and an excess of paste appears on the surface, and then troweled smooth. Mortar in patches shall be applied so that after partial set it can be compressed and rubbed to produce a finish flush and uniform in texture with the adjoining work. All patches shall be warm-moist cured as above specified.
- D. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the masonry replaced by means of a cement gun, or the masonry shall be taken down and rebuilt, all as the Engineer may decide or direct.

### 3.11 SURFACE FINISH

- A. Fins and irregularities on formed surfaces to receive no other finish shall be smoothed.
- B. The top of concrete on which other concrete or unit masonry will later be placed shall be struck off true at the surface indicated on the Drawings or as permitted by the Engineer, as the concrete is being placed. As soon thereafter as the condition of the concrete permits and before it has hardened appreciably (normally within 2 hours after being deposited), all water, scum, laitance, and loose aggregate shall be removed from the surface by means of wire or bristle brooms in such a manner as to leave the coarse aggregate slightly exposed and the surface clean.
- C. Concrete surfaces shall be finished as follows, except as otherwise required by various sections of the Specifications or shown on the Drawings.
  - 1. Wood-float finish shall be given to all top, substantially horizontal, exposed surfaces.
  - 2. Burlap-rubbed finish shall be given to all interior and exterior surfaces placed against forms which will be exposed to view on completion of the work. (Finish shall be to one foot below ground and below normal liquid surface elevations).
  - 3. All surfaces shaped without forms and over which liquids will flow shall be given a steel-trowel finish.
  - 4. Concrete surfaces to which roof insulation or roofing are to be applied shall be finished sufficiently smooth to receive the roofing material, as obtained by steel trowel or very smooth wood-float finish.

# 3.12 METHOD OF FINISHING

A. Broomed Finish: Surfaces to be given broomed finish shall first be given a steel-trowel finish. Immediately after troweling, the surface shall be lightly brushed in one direction with a hair broom to produce a nonslip surface of uniformly good appearance.

#### B. Wood-float Finish:

- 1. Surfaces to be given a wood-float finish shall be finished by tamping with special tools to force aggregates away from the surface, and screeding with straight edges to bring the surface to the required line.
- 2. As soon after the condition of concrete permits and before it has hardened appreciably, all water, film, and foreign material which may work to the surface shall be removed. Rough finishing shall be done with straight edges and derbies. Machine floating if used, shall not be started until the surface will support the float adequately without digging in and bringing excess fines to the surface. At such time, a minimum of machine and hand floating with a wood float shall be employed to bring the finish to a true and uniform surface with no coarse aggregate visible.
- 3. Under no circumstances will sprinkling with water or dusting with cement be permitted during finishing of the slab.
- C. Steel Trowel Finish: Surfaces to be given a steel-trowel finish shall first be given a wood-float finish. This shall be followed by hand troweling with steel trowels to bring the surface to a uniform, smooth, hard, impervious surface free from marks and blemishes. Troweling shall not be started until all water has disappeared from the surface. Over-troweling shall be avoided. Dusting with dry cement or other mixtures or sprinkling with water will not be permitted in finishing.

## D. Burlap Rubbed Finish:

- Immediately after the forms have been stripped and before the concrete has changed in color, all fins and other projections shall be carefully removed by use of a hammer or other suitable means, and imperfections shall be repaired as hereinbefore specified under "Trimming and Repairs". While the surface is still damp, a thin coat of cement slurry of medium consistency shall be applied by means of bristle brushes to provide a bonding coat within pits and minor blemishes in the parent concrete; the coating of large areas of the surface with this slurry shall be avoided.
- 2. Before the slurry has dried or changed color, a dry (almost crumbly) grout composed of 1 volume of cement to 1-1/2 volumes of masonry sand shall be applied. The sand shall have a fineness modulus of approximately 2.25 and comply with the gradation requirements of the ASTM Standard Specifications for Aggregate for Masonry Mortar, Designation C144-76.
- 3. The grout shall be uniformly applied by means of damp (neither dripping wet nor dry) pads of burlap of convenient size (approximately 6 inches square) and shall be allowed to harden for one to two hours, depending on the weather. In hot, dry weather the surface shall be kept damp by means of a fine fog spray during the hardening period.
- 4. When the grout has hardened sufficiently, but before it becomes so hard as to be difficult to remove, excess grout shall be scraped from the surface of the parent concrete by the edge of a steel trowel, without removing the grout from the imperfections. Thereafter, the surface shall be allowed to dry thoroughly and then be rubbed vigorously with burlap to remove all dried grout so that no visible film remains on the surface after the rubbing. The entire cleaning operation for any area shall be so planned that sufficient time is allowed for the grout to dry and be rubbed after it has been cut with the trowel.
- 5. On the day following the grouting and burlap rubbing, the concrete surface shall again be rubbed clean with a dry burlap to remove inadvertent dust. If any built-up film remains on the parent surface, it shall be removed by being rubbed with a fine abrasive stone without breaking through the surface film of the original concrete. Such rubbing shall be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of the concrete. Following the final rubbing with burlap or abrasive stone, the surface shall be thoroughly washed with stiff bristle brushes (worked only along parallel lines) to remove extraneous materials from the surface. The surface shall then be sprayed

- with a fine fog spray to maintain a continually damp condition for at least three (3) days after application of the grout.
- 6. When the burlap-rubbed finish has been completed, the concrete surface shall be smooth, free from discolorations and stains, and of uniformly good appearance.

# 3.13 HOT WEATHER CONDITIONS

A. Placing of concrete under conditions of high temperature, low humidity or wind shall be done in accordance with the American Concrete Institute "Hot Weather Conditions" (latest edition).

#### 3.14 COLD WEATHER CONDITIONS

A. Cold weather concreting procedures precautions shall conform with American Concrete Institute "Cold Weather Concreting" (latest edition).

# **END OF SECTION**

### **SECTION 11310**

# PACKAGE SEWAGE PUMP STATION

### PART 1 - GENERAL

# 1.1 SUMMARY

#### A. Section Includes:

- 1. Package sewage pumping station, structural components, process equipment, piping, valves, electrical and control components, and appurtenant items.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Section 02732 Sewage Force Main
  - 2. Section 02735 Precast Concrete Manhole Structures
  - 3. Section 16050 Electric Service for Package Pump Station.

## 1.2 QUALITY ASSURANCE

#### A. Referenced Standards:

- 1. ASTM International (ASTM):
  - a. A36, Standard Specification for Carbon Structural Steel.
- 2. American Welding Society (AWS):
  - a. A5.1/A5.1M, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
  - b. D1.1, Structural Welding Code Steel.
- 3. National Electrical Manufacturers Association (NEMA):
  - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
  - b. ICS 6, Industrial Control and Systems Enclosures.
- 4. National Fire Protection Association (NFPA):
  - a. 70, National Electrical Code (NEC).
  - b. 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities.
- 5. Occupational Safety and Health Administration (OSHA).
- 6. Underwriters Laboratories, Inc. (UL).

### B. Qualifications:

- 1. Manufacturer shall be regularly engaged in the manufacture of packaged sewage pumping stations for not less than five (5) years.
- Structural design of the pumping station shall be accomplished by a structural engineer registered in the state where the Project is located.

#### C. Single Source Responsibility:

1. Provide single source responsibility for all station components and systems through supplier of package pump station.

### 1.3 SYSTEM DESCRIPTION

- A. The package sewage pumping station shall consist of the following major components:
  - 1. Underground chamber.
  - 2. Entrance tube assembly.
  - 3. Process equipment:
  - 4. Interior piping, valving and pipe supports.
  - 5. Electrical and control systems.

#### 1.4 SUBMITTALS

#### A. Shop Drawings:

1. See Specification Section 01300 for requirements for the mechanics and administration of the submittal process.

- 2. Scaled (1/4 IN = 1 FT minimum) fabrication and/or layout drawings (plan(s) and Specification Section(s)) showing all equipment piping, mechanical and electrical components.
- 3. Information as required by other related narrow-scope Specification Sections.
- 4. Submit Shop Drawing for station and all mechanical, electrical, and instrumentation components, complete, in single, coordinated submittal.
  - a. Provide separate tabs for each major section of work being provided.
- 5. Certifications:
  - a. Provide Owner with a written certification that station has been installed properly and started up and is ready for operation by Owner's personnel.
  - b. Factory checkout certification for all systems in pump station.
- B. Contract Closeout Information:
  - 1. Operation and Maintenance Data:
    - a. See Specification Section 01730 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

#### 1.5 WARRANTY

A. Provide Owner with manufacturer's warranty guaranteeing pumping station to be free from defects for 2 years from date of Owner acceptance.

### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

- 1. Package pump station:
  - a. Engineered Fluid, Inc.
  - b. Dakota Pump
  - c. USEMOC
  - d. Crane
  - e. Approved Equivalent
- 2. Ladder fall protection system:
  - a. Miller Equipment.
  - b. DBI/SALA.
  - c. North Specialty Products.
- 3. Control panel enclosure:
  - a. Hoffman.
  - b. Hennessey
  - c. Approved Equivalent

#### 2.2 MATERIALS OF CONSTRUCTION

- A. Structure Precast Concrete or Reinforced Fiberglass
- B. Float Switches and Switch Support:
  - 1. Floats: Polypropylene or Teflon coated 316 stainless steel.
  - 2. Cable jacket: PVC or neoprene.
  - 3. Cable clamp: Polypropylene or 316 stainless steel.
  - 4. Float support: 304 stainless steel pipe and anchor hardware.

C. Conduits: Steel.

#### 2.3 PUMP STATION COMPONENTS

A. Underground Chamber:

- 1. Factory assembled.
- 2. Welded construction, inside and out.
  - a. Reinforced as required for loadings.

- 3. Dead load design criteria: Soil and hydrostatic loadings associated with burial depth shown on Drawings.
- 4. Live load design criteria: H20 truck.
- 5. Nominal shape and dimensions: As shown on Drawings.
- 6. Walls
  - a. Thickness of plate: Minimum 3/8 IN.
  - b. Equip with sleeves where piping or conduit penetrates chamber walls.
- 7. Sump
  - a. Thickness of plate: Minimum 1/4 IN.
  - b. Minimum depth: 10 IN.
  - c. Configuration as shown on Drawings.
- 8. Weld lifting eyes to chamber head sized to support entire weight of completed chamber.
- 9. Grind smooth all welds prior to painting.

#### B. Entrance

1. Fiberglass or Aluminum

## C. Grinder Pumps:

- 1. Pentair (Myers) Model WGX75HH or Approved Equivalent
  - a. Rated for 66 GPM at 112' TDH
  - b. 480 V power.
  - c. Thermal overload protection.
  - d. Float switch for activating and deactivating pump.

### D. Interior Piping, Valving and Pipe Supports:

- 1. Piping stainless steel
- 2. Valving PVC check and ball valves

#### E. Electrical and Control Systems:

- 1. Power distribution:
  - a. Wiring: Copper conductor with type XHHW insulation.
  - b. Starters: Combination magnetic type with MCP type circuit breaker disconnect, NEMA full size rated with ambient compensated thermal type overload relay with external reset button and oversized control power transformer.
  - Service disconnect for station: Thermal magnetic circuit breaker sized and located per NFPA 70.
  - d. Install wiring in accordance with NFPA 70, NEMA and applicable local codes.
  - e. Provide selectively polarized, grounded convenience outlets located close to equipment having plug-in power connection such as sump pump and dehumidifier.
  - f. Provide short conduit leads of flexible, liquid-tight polyvinyl covered steel with compatible grounding fittings between the fixed conduit and mechanical equipment requiring power.
  - g. Provide duplex safety grounding receptacle on side of pump control panel.
  - h. Install all wiring outside of control panels in conduit except for 115 V items which are provided with power cords for receptacle power.
  - i. Furnish thermal magnetic circuit breakers for branch disconnect service, over current protection of all motor controls and all auxiliary circuits.
    - 1) Label switches using phenolic nameplates.
- 2. Control components:
  - a. Pump control panel:
    - 1) Prefabricated steel enclosure.
    - 2) Provide NEMA 4X panel.
    - 3) Push buttons and selector switches to have NEMA A600 rated contacts.
    - 4) Indicating lights to be push-to-test type.
      - a) Provide green lens for on or running, red for off or stopped and blue for alarm.
    - 5) Utilize plastic sleeve type wire markers to identify all wires.
      - a) Identify circuit number, function and polarity.
    - 6) Panel face mounted components:

- a) HAND/OFF/AUTO switch for each wastewater pump.
- b) Status indicating light for each pump.
- c) Alarm status lights for high and low wet well.
- d) Alarm condition of each grinder.
- e) Six (6) digit non-resettable running time indicator for each wastewater pump.
- f)Pump alternator ON/OFF switch.
- g) Station flooding alarm and alarm reset switch.

#### b. Float control system:

- 1) Provide four (4) field adjustable floats in wet well for wastewater pump control.
- 2) See Drawing for float function and respective elevation.
- 3) Level switches:
  - a) Tilt type.
  - b) Sealed mercury switch in float.
  - c) Provided complete with flexible electrical cable length required for application.
  - d) Contact rated at 4.5 A at 120 Vac.
- 4) 1 IN DIA stainless steel support pipe connected to wet well wall using stainless steel mounting brackets and hardware.

#### F. Miscellaneous:

- 1. Fall Protection:
  - a. Provide fall protection for access hatch.
- 2. Anchor bolts:
  - a. Size and number to be determined by station manufacturer.
  - b. Sized to resist uplift on station due to hydrostatic forces.
- 3. Alarm beacon:
  - a. Rotating sealed beam incandescent type.
  - b. 200 W, 120 Vac.
  - c. Metal globe guard enclosing red lens.
  - d. UL listed for outdoor use.

#### 2.4 CORROSION PROTECTION

- A. After factory welding and fabrication of entire pump chamber, commercial blast clean inside and outside surfaces to surface preparation requirements defined in Specification Section 09 96 00.
- B. After factory welding and fabrication of entrance tube, commercial blast clean inside and outside surfaces to surface preparation requirements defined in Specification Section 09 96 00.
- C. Factory paint interior and exterior station surfaces per Specification Section 09 96 00.
- D. Factory paint all interior equipment and piping in accordance with Specification Section 09 96 00.

#### 2.5 SOURCE QUALITY CONTROL

#### A. Testing:

- 1. All components of pump station shall be given an operational test at factory to check for excessive vibration, for leaks in piping or seals, and for correct operation of automatic control system and auxiliary equipment.
  - a. Correct all deficiencies.
- 2. Couple pump suction and discharge lines to a reservoir and have the pumps recirculate water for at least 1 HR under simulated service conditions.
- Adjust automatic control to start and stop pumps at approximate levels required by job conditions.

#### 2.6 MAINTENANCE MATERIALS

- A. See individual equipment Specification Sections.
- B. Touch up kit for coating field welds and for repair of scratches.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install concrete base under entire pump station stricture.
- B. Attach package pump station to concrete base with anchor bolts.
- C. Seal annular space between wall sleeves and piping/conduit with modular mechanical seals for watertight seal.
- D. Seal all conduits between classified and unclassified areas in accordance with NFPA 70.
- E. Terminate level switch cables in common junction box located in pump chamber.
- F. Install floats at elevations shown on Drawing.
- G. Make main power connection to station in accordance with NFPA 70.
- H. Perform all welding in accordance with AWS D1.1.
- I. Use Series E70 electrodes conforming to AWS A5.1/A5.1M for all welding.

#### 3.2 FIELD QUALITY CONTROL

A. Coordinate and pay for the services of a factory trained representative for a maximum period of 16 HRS to perform the initial start-up of the lift station, and instruct personnel who will be operating the lift station in the required maintenance and service procedures.

### **END OF SECTION**

#### **SECTION 16050**

#### ELECTRIC SERVICE FOR PACKAGE PUMPING STATION

#### **PART 1 - GENERAL**

#### 1.1 WORK INCLUDED

- A. This section includes the site work for providing electrical service to the package sewage pump station.
- B. The work for this project includes all labor, tools, equipment, and materials necessary to completely install, test, place in service and deliver to the Owner a complete electrical system in accordance with the following specifications and associated drawings.
- C. The electrical subcontractor shall be a licensed electrical contractor in the state of Kentucky.

#### D. Project Description:

- 1. Provide 480 Volt, 3 phases, 4 wire, 200 amp electrical service to the booster pump station. This shall include provision and installation of a utility pole, conduit, wire, fuses, meter socket, grounding, and associated devices.
- 2. The Contractor shall coordinate with Kentucky Utility (KU) for the installation of electrical service to the site. Contractor shall pay KU any costs associated with the installation. Obtain electrical permit and inspection.
- 3. Provide "as built" mark ups of electrical drawings.

#### 1.2 RELATED WORK

- A. Package Sewage Pumping Station Section 11310
- B. Electrical Work Section 16000

#### 1.3 SUBMITTALS

- A. Shop Drawings, clearly marked to show only items applicable to this specific contract, shall be submitted for review and shall include complete sizing of components.
- B. Any items substituted by the Contractor without the approval of the Project Manager shall be subject to replacement by the Contractor at no cost to the Owner and at no impact on the project schedule.

#### 1.4 REFERENCES

- A. American National Standards Institute (ANSI)
- B. Kentucky and Local Building Codes
- C. National Electrical Code (NEC)
- D. National Electrical Manufacturers Association (NEMA)
- E. National Electric Safety Code (NESC)
- F. National Fire Protection Code (NFPA)
- G. Underwriter's Laboratories Inc (UL)

#### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. The Contractor shall furnish and install the items listed.
- B. Note that the manufacturers and part numbers provided are considered minimum design requirements and are not meant to inhibit the Contractor from providing components of equal or better quality. However, the Contractor shall receive written approval from the Project Manager for any component substituted. The materials used shall be new, unused and as hereinafter specified.

#### 2.2 MATERIALS

- A. Utility Metering
  - 1. Provide materials as required by Electric Utility for installation of metering equipment, service conductors, and mounting of utility company equipment.
- B. Service Rated Automatic Transfer Switch
  - 1. 480V, 3-pole, 4-wire, 200Amp
  - 2. NEMA 3R with inner door for operator interface devices and deadfront, padlockable outer door
  - 3. Delayed transition operation
  - 4. Anti-condensate heater
  - 5. Microprocessor controller and keypad with display
  - 6. Test-Automatic-Bypass delay selector switch
  - 7. Switch position and source availability indicator lights
  - 8. 120VAC, dry contacts for the following SCADA signals:
    - a. Normal Source Available
    - b. Normal Source Available
    - c. Switch in Normal Position
    - d. Switch in Emergency Position
  - 9. Manufactured by Russelectric or equal.

#### C. Conduit

- All exposed conduit shall be rigid metal conduit (RMC), hot dip galvanized with threaded ends and cast fittings and condulets.
- Underground conduit to the pump station shall be rigid, heavy wall, steel conduit, encased in concrete with threaded watertight connections and shall be adequately sized to handle the type, number, and size of the incoming service conductors.
- 3. Conduit sizes shall be as indicated on the drawings, minimum 3/4".
- 4. Exposed conduit stubs for future use shall be terminated with galvanized pipe caps.

#### D. Wire and Cable

- 1. All conductors shall be 98% conductive stranded copper unless noted otherwise.
- 2. All conductors shall be rated for 600 Volts with XHHW, 90° C insulation.
- 3. Power wires shall not be less than #12 AWG and control wires shall not be less than #14 AWG.

#### E. Ground Rods

1. The ground rods shall be 3/4" x 10' copper or copper-clad steel.

#### F. Electrical Service Cabinet

- 1. Fabricate as shown on drawings and as necessary in field.
- 2. Provide all equipment supports as necessary, including conduit and raceway supports and enclosure supports.
- 3. All materials shall be stainless steel.
- 4. Unistrut shall be P1000.
- 5. Include end caps for unistrut.

#### **PART 3 - EXECUTION**

#### 3.1 GENERAL CONSTRUCTION

#### A. Continuous Work

1. The Contractor shall be aware that work on this project shall be continuous. Periods of intermittent work shall not be permitted.

#### B. Workmanship

 All devices shall be mounted, fabricated and wired with the highest quality workmanship by builders and electricians with at least 3 years experience building and wiring controls and enclosures.

#### C. Construction Coordination

- The Contractor shall be responsible for coordination with the appropriate utility for termination of power and phone conductors.
- 2. Power shall be provided to pump station concurrent with the installation of the station.

#### 3.2 INSTALLATION

A. Equipment Installation - All equipment supplied shall be installed in accordance with manufacturers' recommendation.

#### B. Code Inspection

- 1. This installation shall in all respects conform to all local and state codes and to the latest edition of the National Electrical Code including use of hand tools and temporary services.
- 2. All electrical work shall be inspected by the local Electrical Inspector.
- Any concealed work shall be inspected by the Electrical Inspector prior to concealment. If concealed work must be exposed for inspection, all additional costs shall be the responsibility of the Contractor.

#### C. Grounding

- 1. The ground rods shall be driven below grade in direct contact with earth.
- 2. The grounding clips shall be connected to the ground conductor.
- 3. The ground conductors shall be connected by Cadweld to the ground rods.
- 4. Provide foundation grounding where required.
- 5. Provide equipment grounding conductor in all branch panel feeder circuits and in all branch circuits serving lighting fixtures, receptacles, equipment, etc.
- 6. Size conductor per NEC Table 250-122.

#### D. Conduit Installation

- . The conduit routings shown on the contract drawings are for concept only, actual routings may vary.
- The Contractor shall layout all conduit systems so as to avoid conflict with other services or systems. Routing of conduit shall be such that it is not near moving machinery, piping, or equipment. Conduit routing shall not prevent or block access to other equipment, piping, or inhibit maintenance functions.
- All conduit shall be installed with runs parallel or perpendicular to wall structural members or intersection of vertical planes and ceilings, with right angle turns consisting of metal fittings or symmetrical bends.
- 4. Conduit shall be capped during construction to prevent entrance of dirt, trash, and water. Caps shall be threaded PVC or galvanized rigid steel.
- 5. Underground conduit shall be galvanized Rigid Metallic Conduit concrete encased (2500 psi, Class A concrete) with 3" of concrete all around and at least 24 inches of earth cover, native backfill. Metal underground marking tape shall be placed near top of trench for future detection.

#### E. Wiring Practice

- 1. No more than two wires shall be landed on a termination point.
- 2. All wires shall be marked at every termination point using printed labels.

#### F. Wire Identification

- 1. Conductor identification of branch control circuits shall be by color coding.
- 2. Wire shall be color coded and sized per the following chart, unless noted otherwise on the contract drawings:

a.	24 VDC	Control	Orange, Min. #14 AWG
b.	24 VDC	Negative	Blue, Min. #14 AWG
c.	120 VAC	Control	Red, Min. #14 AWG
d.	120 VAC	Hot	Black, Min. #12 AWG
e.	120 VAC	Neutral	White, Min. #12 AWG
f.	All AC	Ground	Green, Min. #12 AWG
g.	480 VAC	Motor Leads	Black, Min. #12 AWG

#### G. Wire Markers

- 1. All conductors shall be identified by plastic-coated sleeved printed markers or stamped metal foil markers which are oil resistant and permanently attached.
- Conductor identification shall be provided within each enclosure where tap, splice or termination is made.
- Control circuit termination shall be properly identified per the engineering drawings or documents.

#### H. Splices

- 1. Splices shall be made on terminal blocks only.
- 2. Splices shall not be made with wire nuts or bolted connection wrapped with electrical tape.

#### I. Connectors

- Staycon fork-style connectors shall be used for all stranded conductor connections to wiring devices.
- 2. Landing stranded wire directly on the wiring devices will not be acceptable.

#### J. Pole-Mounted Equipment

- Provide hot-dipped galvanized uni-strut and lag screw to mount any electrical equipment to wooden poles and posts.
- 2. Cap uni-strut ends.

#### K. Enclosure Penetration

- 1. The Contractor shall not penetrate enclosures unless required.
- 2. Penetrations shall not violate the NEMA rating of the enclosure.
- 3. Unused holes or conduits shall be properly sealed with hole plugs or conduit plugs.

#### L. Sealing of Equipment

- 1. All outdoor equipment shall be permanently sealed at the base, and all openings into equipment shall be screened or sealed with concrete grout to keep out rodents and insects the size of wasps and mud daubers.
- 2. Small cracks and openings shall be sealed from inside with silicone sealant, Dow-Corning "795" or General Electric "SCS 1200".

#### 3.4 ACCEPTANCE AND TESTING

#### A. Inspection

- 1. All equipment installed with this project shall be inspected and adjusted prior to placing installation in service.
- It shall be the Contractor's responsibility to prove to the Project Manager that the electrical system provided complies with this specification and the contract documents.
- 3. Proper connection of the anodes shall be verified on the test panels.

# B. Operation Testing

- 1. Electrical contractor must have an electrican at the pump station startup.
- 2. At the pump station start-up, the pump motors provided with the pump station shall be checked for proper rotation. Do not electrically operate the pumps for any length of time without water service and proper lubrication.
- 3. The single phase environmental equipment, lights, etc. that are provided by the pump station manufacturer shall also be checked for proper operation.

#### C. As-Built Records

- 1. The Contractor shall maintain a clean set of neatly marked up drawings as an as-built record of the system.
- 2. As-built drawings shall show all underground conduit run lengths and materials, and a north-south dimension (e.g. 50' South of C/L of Main Street) and east-west dimension for all starting points (e.g. pole), termination points (e.g. vault) and any horizontal bends.

#### **END OF SPECIFICATION**



# 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

US 42 from Four Mile Road to west Ghent City Limits

Project: PCN ## - ####
Item 06-8002.00

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) US 42 Carroll County
- Latitude/Longitude (project mid-point) dd/mm/ss, dd/mm/ss 38^43'36" north, 84^04'46" west
- 7. County (project mid-point) Carroll County
- 8. Project start date (date work will begin): (2)
- 9. Projected completion date: (2)

# A. Site description:

- 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 80,982 CY
- 4. Estimate of total project area (acres) 37.4 Acres
- 5. Estimate of area to be disturbed (acres) 37.4 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 River and McCools Creek
- 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)

# **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.

- 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.

- 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:

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.

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 contract with a hazardous substance.

- 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

- 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:

- 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 successfully completed the KEPSC-RI course as required by Section 213.02.02 of the Standard Specifications for Road and Bridge Construction, current edition.
- 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 form cleaning concrete trucks and equipment.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).

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

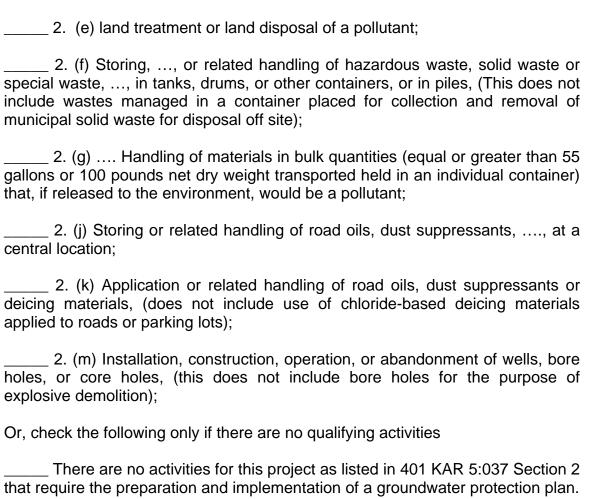
All non-storm water discharges will be directed to the sediment basin or to a filter fence enclosure in a flat vegetated infiltration area or be filtered via another approved commercial product.

# 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 may be conducted as part of this construction project:



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.)

### Contractor and Resident Engineer Plan certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Resident Engineer and Contractor Certification:

2) Resident Engineer signature						
Signed	title					
Typed or	printed name <sup>2</sup>	signature				
(3) Signed	title_	,				
	rinted name <sup>1</sup>	signature				

- 1. Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.
- 2. KyTC note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Project Control Number (PCN) and KPDES number when one has been issued.

Subcontractor

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

# **Sub-Contractor Certification**

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

	Name: Address: Address:			
	Phone:			
The pa	rt of BMP plan this sub	contractor is responsi	ble to implement is	S:
Kentuc dischar dischar	or under penalty of law ky Pollutant Discharge rges, the BMP plan that rged as a result of stor ement of non-storm was	Elimination System p t has been developed m events associated	ermit that authoriz to manage the qu with the constructi	es the storm water ality of water to be on site activity and
Signed	Typed or printed nam	_title e <sup>1</sup>	,signat	ure
	. , pod or primod hum	•	Signat	

1. Sub Contractor Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.



Welcome to the Department for Environmental Protection eForms Application.

06342a4e71a9" (minus the double quotes). Please note, since you selected to save your values, this does NOT constitute as submittal to the Kentucky Department of Environmental Protection (DEP). Please note that some eForms require you to submit supporting upload file(s) or retrieval feature. To retrieve this saved eForm, the eForms application will require you to enter your eForm ID in the appropriate field. The Your eForm has been saved to our database and may be recalled in the future using the following eForm ID: "7ed23468-8bc5-4c2b-95d2attachments. Upload files/attachments are not saved to our system until a final submission; we only save the file path using this save and url for the retrieval is htts://dep.gateway.ky.gov/eForms/default.aspx.

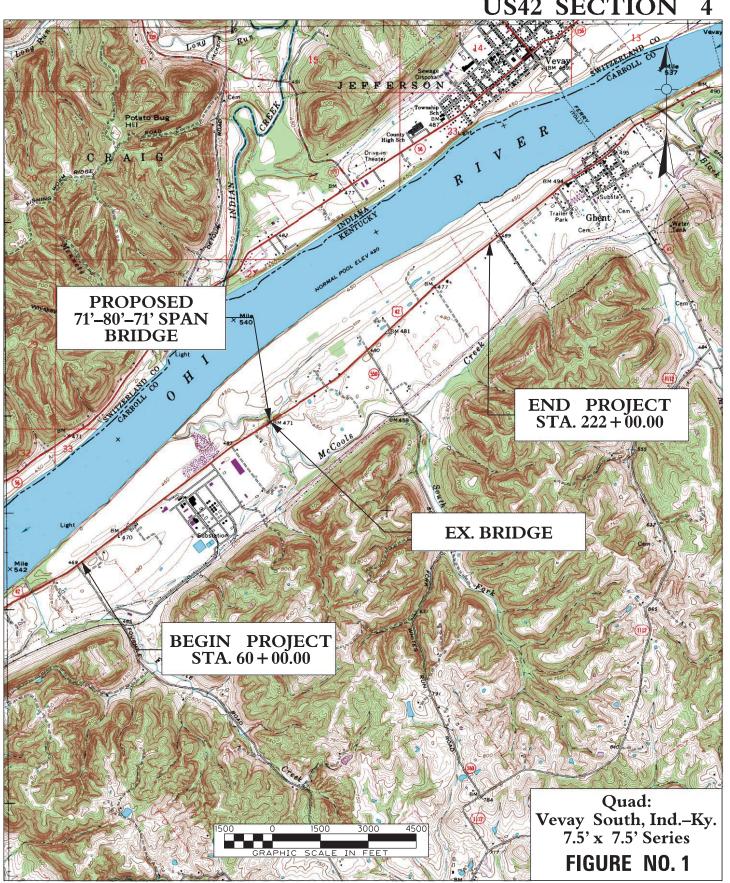
by clicking on the "Continue with Blank eForm" button below or retrieve a previously saved version by entering your eForm Transaction ID Stormwater Discharges Associated with Construction Activity Under the KPDES General Permit). You may continue with a blank eForm You have selected the following electronic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

	ive the latest version of your		previously saved/submitted ID.		
Continue with Blank eForm	Enter your eForm Transaction ID to retreive the latest version of your form:	7ed23468-8bc5-4c2b-95d2-06342a4e71a9	I want a NEW eForm with the values from the previously saved/submitted ID.	Proceed	
<b>Option A:</b> Select this option to fill out a blank eForm.	<b>Option B:</b> Select this option to retrieve a previously saved or submitted eForm.	The check box allows you to use	previously saved/submitted erforms as a "template". The system will generate a	new eForm Transaction ID and allow	you to submit the new tollin to per .

website only supports 45 minutes to complete data entry at any given time and will 'timeout', preventing the ability to save or Firefox and Chrome are the recommended browsers. 2. This website requires Adobe Flash. 3. For Security reasons, the User Interface issues: 1. This website requires browser versions Internet Explorer 11+, Firefox 26+, and Chrome 34+.

Internet Explorer Browser uses the Backspace key as a Hot-Key for the Back button (Previous Page). When selecting values submit your data. Please keep this in mind when filling out an eForm and remember to save often. 4. Please note that the from a Dropdown List, using the backspace key will take you to the previous page and you will need to reenter your information.

# CARROLL COUNTY ITEM NO. 6-8002.10 US42 SECTION 4



# **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.

Subsection:	101.03 DEFINITIONS
Revision:	Add the following Definitions to this section:
110 (181011)	Superpave Mix Design Technologist (SMDT) - An inspector qualified by the KYTC to
	submit, adjust, or approve asphalt mix designs.
	Superpave Plant Technologist (SPT) - An inspector qualified by the KYTC to perform
	routine inspection and process control, acceptance, or verification testing on asphalt mixtures.
Subsection:	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>	108.01 Subcontracting of Contract.
<b>Revision:</b>	Replace the section with the following:
	Do not subcontract, sell, transfer, assign, or otherwise dispose of the Contract or any portion of
	the Contract or Contracts, or of the right, title, or interest therein, without the Engineer's
	written consent. If the Contractor chooses to subcontract any portion of the Contract, a written
	request to sublet work must be submitted on the Subcontract Request (TC 63-35) form for the
	Engineer's approval. When directed by the Engineer, submit a certified copy of the actual
	subcontract agreement executed between the parties.
	The Engineer will allow the Contractor to subcontract a portion, but the Contractor must
	perform with his own organization work amounting to no less than 30 percent of the total
	Contract cost. The Engineer will not allow any subcontractor to exceed the percentage to be
	performed by the Contractor and will require the Contractor to maintain a supervisory role over
	the entire project.
	Do not allow any subcontractor to further subcontract any portion of the work without
	obtaining written consent from the Engineer. When the Engineer gives such consent, the first
	tier subcontractor may further subcontract a portion of his work not to exceed 50 percent of the
	work originally subcontracted to him by the Contractor. Do not allow any second tier
	subcontractor to subcontract any portion of the work.
	Extra work performed by subcontractors in accordance with Section 109 will not be utilized in
	the computation of total dollar amount subcontracted. Subcontract percentages are based upon
	the original contract amount.
	Payment to subcontractors for satisfactory performance of their work or materials supplied must
	be made within 7 calendar days from receipt of payment from the Engineer. Upon request by
	the Engineer, provide proof that payment has been made to the subcontractor within the 7
	calendar days. Progress payments may be withheld for failure to comply with this request
	careficial days. Trogress payments may be withheld for failure to comply with this request

The Engineer's written consent to subcontract, assign, or otherwise dispose of any portion of the Contract does not, under any circumstances, relieve the Contractor or the surety of their respective liabilities and obligations under the Contract. The Engineer will make transactions only with the Contractor. The Engineer will recognize subcontractors only in the similar capacity of employees or workers of the Contractor who are subject to the same requirements as to character and competence as specified in Subsection 108.06.

Lease agreements are acceptable on Department projects. No additional paperwork is needed when equipment is rented from a commercial rental company unless the leased equipment comes with an operator. In these circumstances, payroll records for the operator of the leased equipment must be maintained and submitted by the contractor in accordance with Department policy.

Lease agreements between contractors that involve equipment only will require the submittal of a TC 63-71 Department Equipment Rental Form. If a Contractor is found to be in violation of these requirements, the Engineer reserves the right to withhold payment for the work which was performed in violation of these requirements. This provision does not include the lease or use of equipment from a corporation or company wholly owned by the Contractor. The Contractor shall not use equipment in the performance of the Contract to which title is not held by the Contractor or an approved subcontractor without a submitted lease agreement.

If a public official has provided a documented Declaration of Emergency, then the Engineer may verbally waive the requirement of submitting a TC 63-71 Department Equipment Rental Form until the situation has ended. After the emergency situation ends, immediately remove the equipment from the project or submit a completed TC 63-71 Department Equipment Rental Form to the Engineer.

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108.03 Preconstruction Conference.

#### **Revision:**

Replace 8) Staking with the following:

8) Staking (designated by a Professional Engineer or Land Surveyor licensed in the Commonwealth of Kentucky.

#### **Subsection:**

109.07.02 Fuel.

#### **Revision:**

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.

Crushed Sandstone Base (Cement Treated)

### **Subsection:**

110.02 Demobilization

#### **Revision:**

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;

#### **Subsection:**

112.03.12 Project Traffic Coordinator (PTC).

#### **Revision:**

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).
Revision:	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.
Revision:	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.
<b>Subsection:</b>	201.04.01 Contractor Staking.
Revision:	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.
Revision:	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.
	208.02.01 Cement.
Revision:	Replace paragraph with the following:
	Select Type I or Type II cement conforming to Section 801. Use the same type cement
	throughout the work.
	208.03.06 Curing and Protection.
Revision:	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.
	ou psi.
Subsection:	208.03.06 Curing and Protection.
Revision:	Replace paragraph eight with the following:
	At no expense to the Department, repair any damage to the subgrade caused by freezing.
	1

	Effective with the April 29, 2016 Letting
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
Part:	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.
Part:	A) Seed Mixtures for Permanent Seeding.
Number:	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.
<b>Subsection:</b>	212.03.03 Permanent Seeding and Protection.
Part:	A) Seed Mixtures for Permanent Seeding.
Number:	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.
Part:	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.
Part:	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.
	212.03.03 Permanent Seeding and Protection.
Part:	D) Top Dressing.
Revision:	Change the title of part to D) Fertilizer.
	212.03.03 Permanent Seeding and Protection.
Part:	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
Subsection:	an excessive application of fertilizer at no cost to the Department.
Part:	212.03.03 Permanent Seeding and Protection. D) Fertilizer.
Revision:	
Kevision:	Delete the second paragraph.

Subsections	212.04.04 Agricultural Limestone.					
Revision:	Replace the entire section with the following:					
Kevision.	The Department will measure the quantity of agricultural limestone in tons.					
<b>Subsection:</b>	212.04.05 Fertilizer.					
Revision:	Replace the entire section with the following:					
Kevision:	The Department will measure fertilizer used in the seeding or sodding operations for payment.					
	The Department will measure the quantity by tons.					
<b>Subsection:</b>	212.05 PAYMENT.					
Revision:	Delete the following item code:					
Kevision:	Code Pay Item Pay Unit					
	05966 Topdressing Fertilizer Ton					
Subsection:	212.05 PAYMENT.					
Revision:	Add the following pay items:					
KCVISIOII.	Code Pay Item Pay Unit					
	05963 Initial Fertilizer Ton					
	05964 20-10-10 Fertilizer Ton					
	05992 Agricultural Limestone Ton					
Subsection:	213.03.02 Progress Requirements.					
Revision:						
	Replace the third paragraph with the following:					
	After exposing areas of erodible material, make every effort to stabilize and protect the areas as					
	quickly as possible. Permanently seed and mulch all areas at final grade within 14 days.					
	Temporary stabilization practices on those portions of the project where construction activities					
	have temporarily ceased shall be initiated within 14 days of the date of activity cessation. The					
	Engineer will suspend grading operations for instances where the Contractor fails to sustain					
	erosion control measures to effectively control erosion and to prevent water pollution in					
	accordance with the KPDES Permit. In addition, the Engineer will withhold monies due on					
	current estimates until corrective work has been initiated and is continuously progressing to					
	remediate noted deficiencies. Additionally, should noted deficiencies not be adequately					
	addressed to the satisfaction of the Engineer within 7 calendar days of receipt of written					
	notification of deficiencies, the Department will apply a penalty equal to the daily liquidated					
G 1 4	damages rate until all aspects of the work have been completed.					
Part:	E) Temporary Seeding and Protection.					
Revision:	Delete the second sentence of the first paragraph.					
Subsection: Table:	· · · · · · · · · · · · · · · · · · ·					
Revision:	Required Geogrid Properties  Penlage all references to Test Method "GPL GG2 87" with ASTM D 7737					
Subsection:	Replace all references to Test Method "GRI-GG2-87" with ASTM D 7737.  402.03.02 Contractor Quality Control and Department Acceptance.					
Part:	B) Sampling.					
Revision:	Replace the second sentence with the following:					
IXC VISIUII.	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					
	* *					
1	and 402.03.04 using the Asphalt Mixture Sample Random Tonnage Generator.					

**Subsection:** 402.03.02 Contractor Quality Control and Department Acceptance.

D) Testing Responsibilities. Part:

3) VMA. Number:

**Revision:** Add the following paragraph below Number 3) VMA:

> Retain the AV/VMA specimens and one additional corresponding G<sub>mm</sub> 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 sublot(s) for the duration of the project.

**Subsection:** 402.03.02 Contractor Quality Control and Department Acceptance.

D) Testing Responsibilities. Part:

4) Density. Number:

**Revision:** Replace the second sentence of the Option A paragraph with the following:

Perform coring by the end of the following work day.

**Subsection:** 402.03.02 Contractor Quality Control and Department Acceptance.

D) Testing Responsibilities. Part:

Number: 5) Gradation.

**Revision:** Delete the second paragraph.

**Subsection:** 402.03.02 Contractor Quality Control and Department Acceptance.

H) Unsatisfactory Work. Part: 1) Based on Lab Data. Number:

Replace the second paragraph with the following: **Revision:** 

> 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.

402.03.03 Verification. **Subsection:** 

Replace the first paragraph with the following: Revision:

> **402.03.03 Mixture Verification.** 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 sublot. The Department may perform the mixture verification test on the Contractor's equipment or on the Department's equipment.

Subsection: 402.03.03 Verification.

A) Evaluation of Sublot(s) Verified by Department. Part:

**Revision:** Replace the third sentence of the second paragraph with the following:

> When the paired t-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			
Part: B) Evaluation of Sublo	ots Not Verified by Department.		
<b>Revision:</b> Replace the third sente	nce of the first paragraph with the following:		
When differences betw	veen test results are not within the tolerances listed below, the		
	re the discrepancy according to Subsection 402.03.05.		
<b>Subsection:</b> 402.03.03 Verification			
<b>Part:</b> B) Evaluation of Sublo	ots Not Verified by Department.		
	nce of the second paragraph with the following:		
•	est indicates that the Contractor's data and Department's data are possibly		
not from the same pop	ulation, the Department will investigate the cause for the difference		
according to Subsection	n 402.03.05 and implement corrective measures as the Engineer deems		
appropriate.			
<b>Subsection:</b> 402.03.03 Verification			
Part: C) Test Data Patterns.	•		
· /	ntence with the following:		
*	e substantial differences between the verified and non-verified sublots,		
_	erform further comparative testing according to subsection 402.03.05.		
Subsection: 402.03 CONSTRUCT	· · · · · · · · · · · · · · · · · · ·		
	section: 402.03.04 Testing Equipment and Technician Verification.		
$\mathcal{E}$	nimum quantity of 20,000 tons and for every 20,000 tons thereafter, the		
	an additional verification sample at random using the Asphalt Mixture		
_	age Generator in order to verify the integrity of the Contractor's and		
*	ry testing equipment and technicians. The Department will obtain a		
_	east 150 lb at the asphalt mixing plant according to KM 64-425 and split		
_	FO R 47. The Department will retain one split portion of the sample and		
	on to the Contractor. At a later time convenient to both parties, the		
	actor will simultaneously reheat the sample to the specified compaction		
_	e mixture for AV and VMA using separate laboratory equipment		
1 -	ponding procedures given in Subsection 402.03.02. The Department		
	ences in test results between the two laboratories. When the difference		
	AV or VMA is not within $\pm 2.0$ percent, the Department will investigate		
	pancy according to Subsection 402.03.05.		
<b>Subsection:</b> 402.03.04 Dispute Res	·		
<b>Revision:</b> Change the subsection			
Subsection: 402.05 PAYMENT.			
	chedule Compaction Option A Base and Binder Mixtures		
Table: AC			
<b>Revision:</b> Replace the Deviation	Replace the Deviation from JMF(%) that corresponds to a Pay Value of 0.95 to ±0.6.		
<b>Subsection:</b> 403.01 Description.			
*	hree and four of the first paragraph with the following:		
	lant Technologist (SPT) or Superpave Mix Design Technician (SMDT)		
qualified by the Labor			
Control concerns arigin	atories' Quality Acceptance program. Be available to address all Quality		
Control Concerns arisin	atories' Quality Acceptance program. Be available to address all Quality and during work performed under section 403.		
<b>Subsection:</b> 403.02.10 Material Tra	ng during work performed under section 403. unsfer Vehicle (MTV).		
<b>Subsection:</b> 403.02.10 Material Tra <b>Revision:</b> Replace the first senter	ng during work performed under section 403.  nnsfer Vehicle (MTV).  nce with the following:		
<b>Subsection:</b> 403.02.10 Material Tra <b>Revision:</b> Replace the first senter	ng during work performed under section 403. unsfer Vehicle (MTV).		

Cubacation	403.03.03 Preparation of Mixture						
Part:	C) Mix Design Criteria						
Number:							
Revision:	2) Revise part 2) to read as follows: Selection of Optimum AC. Normally, the Department will						
Revision:	approve the AC at an air-void content of 4.0 percent. The Engineer may assign an AC						
	corresponding to other air-void levels as deemed appropriate. Ensure the optimum AC is a						
	minimum of 5.2 percent by weight of the total mixture for all 0.5-inch nominal surface						
	mixtures and 5.5 percent by weight of the total mixture for all 0.38-inch nominal surface						
	mixtures.						
Subsection:	412.02.09 Material Transfer Vehicle (MTV).						
	Replace the paragraph with the following:						
Kevision.	Provide and utilize a MTV with the minimum characteristics outlined in section 403.02.10.						
Subsection	412.03.07 Placement and Compaction.						
Revision:	Replace the first paragraph with the following:						
120,120,111	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 fo						
	payment and will consider its use incidental to the asphalt mixture.						
<b>Subsection:</b>	501.03.19 Surface Tolerances and Testing Surface.						
Part:	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.						
	501.03.05 Weather Limitations and Protection.						
	Replace the reference to Subsection 501.03.19 in Paragraph 5, with Subsection 501.03.20.						
	601.02.02 Cement						
<b>Revision:</b>	Replace the third sentence with the following: The Department will allow the use of Type						
	IP(≤20), Type IS(≤30), Type IL, Type II, and Type III when the Engineer approves.						
	601.02.02 Cement						
<b>Revision:</b>	Replace the fifth sentence with the following: If unsatisfactory test results are obtained using						
	Type IP( $\leq 20$ ), Type IS( $\leq 30$ ), Type IL, Type II, or Type III cement complete the work using						
	Type I cement.						

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# Supplemental Specifications to the Standard Specifications for Road and Bridge Construction, 2012 Edition Effective with the April 29, 2016 Letting

		Effec	tive with	the April 2	29, 2016 Let	iting	
Subsection:	601.03.02 Concre	te Producer Resp	onsibilitie	S.			
Part:	E) Trip Tickets.						
Revision:	Replace the section	on with the follow	ving:				
	*		•	information	shown in the	e table below. Certify tha	
		•				oproved mix design.	
	Ensure that the plant						
	_	_			_	nation on the back of the	
	trip ticket.	nte inspector win	complete	an other nec	cessary illion	nation on the back of the	
	urp ticket.						
	Contract Id:	Proj. Number:	Date:	County:			
	Truck No:	Producer Name:		SiteMana	ger Sample Id:		
	Qty(Yds <sup>3</sup> ):	Time Loaded (Nor	n Agitated C	oncrete Only	):		
	Begin Mixing	Time: /	AM PI	И REV _			
	Set Retarder l	Jsed	Yes	Type	No		
	Water Reduce	er Used	Yes	Type	No		
	Water Under	run 6	Gal/Yd <sup>3</sup>	T	otal Gallons		
	Design W/C:	Actual W/C:	Slump (inc	thes)			
		t Information:					
		Description: Desi	gn Qty: R	equired: Bat	ched: %Var:	%Moisture: Actual:	
	Remarks:						
	The state of the s						
	*The data on	this ticket is correc	t for the an	nroved concr	ete miv design	*	
	The data on	unis tienee is correc	it for the up	proved correr	ete iiix design		
	Signature	a.			Date:		
	Signature	KRMCA Level II Te	schnisian o	r Diant Mana			
	-	KRIVICA LEVEL II TE	chinician o	r Plant Iviana	ger		
	601.03.03 Proport	tioning and Requi	irements				
Part:	A) Concrete						
Revision:	Revise Table for INGREDIENT PROPORTIONS AND REQUIREMENTS FOR VARIOUS						
	CLASSES OF CONCRETE as follows: Replace "M1 w/ Type 1 cement" with "M1 w/ Type 1						
	or blended hydrau	ılic cement"					
Subsection:	601.03.03 Proport	tioning and Requ	irements				
Part:	C) Mixtures Using	g Type IP, IS, and	d I(SM) C	<mark>ement or Mi</mark>	neral Admixt	tures	
Revision:	Revise part C) he	ader to read as fo	llows: Mi	xtures Using	g Type IP(<20	0), IS( $\leq$ 30), and IL	
	Cement and Mine			`	<i>y y</i>	// <del>(_</del> //	
Subsection:	601.03.03 Proport		irements				
Part:	C) Mixtures Using			ement or Mi	neral Admiy	hires	
Number:	1)	5 1 ypc 11 , 10, and	u I(BIVI) C	cincin or ivii	incrai / taima	uics	
		and to read on fall	over Tree	. ID(<20) IS	C(<20) II Co	una aunt	
Revision:	Revise first senter			€ 1F( <u>&gt;</u> 20), IS	<u>5(≥50), 1L Ce</u>	ment.	
Subsection:	601.03.03 Proport	•			1.4.1		
Part:	C) Mixtures Using	g Type IP, IS, and	a I(SM) C	ement or Mi	neral Admixi	ures	
Number:	2)		2.11				
Revision:	Revise second ser	itence to read as	tollows: T	he use of fly	y ash, blast fu	irnace slag cement, or	

micosilica in concrete is the Contractor's option.

	COL 02 02 P
	601.03.03 Proportioning and Requirements
Part:	C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures
Number:	2)
Revision:	Revise the first sentence in the second paragraph to read as follows: When the ability to use
	blast furnace slag cement or microsilica has not been demonstrated have the concrete producer
	provide trial batches in accordance with Subsection 601.03.02 G) 1).
<b>Subsection:</b>	601.03.03 Proportioning and Requirements
Part:	C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures
Number:	2)
Part:	b)
<b>Revision:</b>	Revise first sentence to read as follows: Blast Furnace Slag Cement
<b>Subsection:</b>	601.03.03 Proportioning and Requirements
Part:	C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures
Number:	2)
Part:	b)
Revision:	Revise second sentence to read as follows: When added as a separate ingredient, use Grade
	120 or Grade 100 slag to reduce the quantity of cement, except do not use blast furnace slag
	cement to reduce the quantity of Type IS( $\leq$ 30) cement.
<b>Subsection:</b>	601.03.03 Proportioning and Requirements
Part:	C) Mixtures Using Type IP, IS, and I(SM) Cement or Mineral Admixtures
Number:	2)
Part:	b)
Revision:	In part b), replace all references to "GGBF slag" with "blast furnace slag cement".
	601.03.04 Classes and Primary Uses
Part:	H) Class M1
Revision:	Revise part H) to read as follows: High early strength for bridge joint repair and full or partial
ACVISION.	depth bridge deck patching. (Type 1 cement or blended hydraulic cement)
Subsection	603.03.06 Cofferdams.
Revision:	Replace the seventh sentence of paragraph one with the following:
ite vision.	Submit drawings that are stamped by a Professional Engineer licensed in the Commonwealth of
	Kentucky.
Subsection	605.03.04 Tack Welding.
Revision:	Insert the subsection and the following:
Kevision.	605.03.04 Tack Welding. The Department does not allow tack welding.
Subsection:	606.03.17 Special Requirements for Latex Concrete Overlays.
Part:	A) Existing Bridges and New Structures.
Number:	1) Prewetting and Grout-Bond Coat.
Revision:	Add the following sentence to the last paragraph: Do not apply a grout-bond coat on bridge
IXCVISIUII.	decks prepared by hydrodemolition.
Subsection:	609.03 Construction.
Revision:	Replace Subsection 609.03.01 with the following:
Wealsion:	*
1	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
1	supports.
1	609.03.01 B) Lift Loops. Cut all lift loops flush with the top of the precast beam once the
1	beam is placed in the final location and prior to placing steel reinforcement. At locations where
1	lift loops are cut, paint the top of the beam with galvanized or epoxy paint.
1	
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	611.03.02 Precast Unit Construction.
Revision:	Replace the first sentence of the subsection with the following:
	Construct units according to ASTM C1577, replacing Table 1 (Design Requirements for
	Precast Concrete Box Sections Under Earth, Dead and HL-93 Live Load Conditions)
	with KY Table 1 (Precast Culvert KYHL-93 Design Table), and Section 605 with the
	following exceptions and additions:
<b>Subsection:</b>	613.03.01 Design.
Number:	2)
Revision:	Replace "AASHTO Standard Specifications for Highway Bridges" with "AASHTO LRFD
	Bridge Design Specifications"
<b>Subsection:</b>	
Revision:	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
	<sup>3</sup> / <sub>4</sub> inch.
Subsection:	615.06.03 Placement of Reinforcement in Precast 3-Sided Units.
Revision:	Replace the reference of 6.6 in the section to 615.06.06.
Subsection:	615.06.04 Placement of Reinforcement for Precast Endwalls.
Revision:	Replace the reference of 6.7 in the section to 615.06.07.
	615.06.06 Laps, Welds, and Spacing for Precast 3-Sided Units.
Revision:	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.
Subsection:	615.06.07 Laps, Welds, and Spacing for Precast Endwalls.
Revision:	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.
	to-center of the wife fautic sheet shall not be less than 2 menes of more than 6 menes.

Subsection:	615.08.01 Type of Test Specimen.			
Revision:	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.			
Subsection	615.08.02 Compression Testing.			
Revision:	Delete the second sentence.			
Subsection:	615.08.04 Acceptability of Core Tests.			
Revision:	Delete the entire subsection.			
	615.12 Inspection.			
Revision:	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.			
Revision:	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.			
Revision:	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 paragraph with the following:			
	Locate poles to avoid trees, drainage, structures, etc. Regardless of the station & offset noted,			
	locate all poles/bases behind guardrail a minimum of 4 feet behind the face of the guardrail.			
	All poles shall be placed as close to stations and offsets as stated on Plans to provide proper			
	illumination. If any pole needs to be relocated from stations indicated, the Division of Traffic			
	Operations shall be contacted. When submitting brochures for suggested luminaires include			
	iso lux curves, IES type distribution, lamp lumens, and typical ballast factor used for each type			
	of luminaire. Submit the photometric data in a digital IES format to the Division of Traffic			
	Operations. Include with the submittal a point of contact and phone number to answer			
	technical questions about the luminaire.			
Subsection:	716.03.02 Lighting Standard Installation.			
Part:	A) Conventional Installation.			
Revision:	Replace the third sentence with the following: Orient the transformer base so the door is			
	positioned on the side away from on-coming traffic.			
Subsection	716.03.02 Lighting Standard Installation.			
Part:	A) Conventional Installation.			
Number:	1) Breakaway Installation and Requirements.			
	Replace the first sentence with the following: For breakaway supports, conform to Section 12			
Revision:				
	of the AASHTO Standard Specifications for Structural Supports for Highway Signs,			
	Luminaires, and Traffic Signals, 2013-6th Edition with current interims.			

**Subsection:** 716.03.02 Lighting Standard Installation.

Part: B) High Mast Installation

**Revision:** Replace the first three sentences of the first paragraph with the following: Install each high

mast pole as noted on Plans. Install each high mast pole on a separate circuit and use luminaires

with light patterns as indicated. Orient luminaires as shown in Plans.

**Subsection:** 716.03.02 Lighting Standard Installation.

Part: B) High Mast Installation
Number: 2) Concrete Base Installation

**Revision:** Modification of Chart and succeeding paragraphs within this section:

Drilled Shaft Depth Data							
3:1 Ground		2:1 (	Fround	1.5:1	Ground		
Level Ground		Sl	ope	Sl	ope	Slo	pe <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			
Vert	ical Bars	Ties	s or Spiral
Size			Spacing or
	Total	Size	Pitch
#10	16	#4	12 inch

Note 1: Shaft length is 22 feet for cohesive soil only. For cohesionless soil, contact Geotechnical Branch for design.

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

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 design 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

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

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.

	g
<b>Subsection:</b>	716.03.03 Trenching.
Part:	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.
<b>Subsection:</b>	716.03.03 Trenching.
Part:	B) Trenching of Conduit for Non-Highmast Cables.
Revision:	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.
	716.03.04 Conduit Installation.
<b>Revision:</b>	Replace the first two sentences of the paragraph with the following: Provide rigid steel
	conduit encasement for all conductors except as specified in the Contract. Provide conduit that
<b>a</b> 1	is listed on the Department's List of Approved Materials.
<b>Subsection:</b>	716.03.04 Conduit Installation.
Part:	A) Conduit Requirements in Junction Boxes.
Number:	1) Highmast Ducted Cable.
<b>Revision:</b>	Replace the first two sentences with the following: Install conduit horizontally through the
	junction box. Conduit shall be 4 inches from the bottom and 4 inches from the side of the
<b>Subsection:</b>	junction box. 716.03.04 Conduit Installation.
Revision:	Add the following to the Part to the Subsection:  G) Bore and Jack. Construction
Revision:	methods shall be in accordance with Subsections 706.03.02, paragraphs 1, 2 and 4.
<b>Subsection:</b>	716.03.08 Splicing.
Revision:	Replace the last sentence of the paragraph with the following: Ensure the splices are of the
Revision.	correct size for the wire being used.
<b>Subsection:</b>	716.03.10 Junction Boxes.
Revision:	Replace subsection title with the following: Electrical Junction Box and replace the last
	sentence of the paragraph with the following: Any additional junction boxes shall be approved
	by the Engineer.
<b>Subsection:</b>	716.03.13 Temporary Lighting.
<b>Revision:</b>	Change subsection heading to the following: 716.03.13 Temporary/Maintain Lighting.
<b>Subsection:</b>	716.03.13 Temporary /Maintain Lighting.
<b>Revision:</b>	Replace the entire section with the following:
	The Contractor shall furnish and install all materials necessary to temporarily light the proposed
	roadway to design standards in Subsection 716.03. The Contractor shall submit his proposed
	design of temporary lighting to the Division of Traffic Operations for approval at least 30 days
	before installation.
	Maintain all lighting elements impacted within or outside the project limits until new lighting elements are installed and a functional inspection has been performed on the new lighting elements. The Contractor shall submit a proposed design for maintaining lighting to the
	Division of Traffic Operations for approval at least 30 days before installation.

<b>Subsection:</b>	716.03.14 Remove Lighting.
<b>Revision:</b>	
	Replace the section with the following: Remove all lighting equipment that is identified by
	the Engineer as no longer necessary including, but not limited to, the following: pole bases,
	poles, junction boxes, cabinets, and wood poles. Pole bases shall be removed a minimum of
	one foot below finished grade by chipping off or other method that is approved by the
	Engineer. Dispose of all removed concrete off right-of-way. Wood poles shall be removed a
	minimum of one foot below finished grade. Backfill holes with material approved by the
	Engineer. Conduit may be abandoned in the ground. All materials shall be removed from the
	project as directed by the Engineer. Transformers not owned by a utility shall be tested for
	PCB's and disposed of in accordance with state regulations.
<b>Subsection:</b>	716.03.15 Painting.
<b>Revision:</b>	
	Replace the first sentence with the following: Clean non-galvanized or damaged surfaces of
	exposed junction boxes, pull boxes, control panels, poles, and similar equipment, and apply
G 1	one coat of an inhibiting paint and two coats of aluminum paint.
	716.04.01. Poles.
<b>Revision:</b>	Change the subsection heading to 716.04.01 Pole and replace the last sentence of the
	subsection with the following: The Department will not measure anchor bolts, washers, nuts,
	anchor bolt covers, ground lugs, and any associated hardware for payment and will consider
G 1	them incidental to this item of work.
<b>Subsection:</b>	716.04.02 High Mast Pole.
<b>Revision:</b>	
	Replace the second sentence with the following: The Department will not measure the
	lowering device, anchor bolts, head frame assembly, cables, winch unit, power cables, wiring,
	connectors, circuit breakers, grounding lugs, ground wire, ground rods, conduits, test plugs,,
	adjustment and calibration of the unit to provide the desired operation, and any associated
	hardware for payment and will consider them incidental to this item of work.
<b>Subsection:</b>	716.04.03 Bracket.
<b>Revision:</b>	Replace the second sentence with the following: The Department will not measure any
	associated hardware needed for attaching the bracket to the pole for payment and will consider
	them incidental to this item of work.
<b>Subsection:</b>	716.04.04 Pole Base.
Revision:	Change the subsection heading to 716.04.04 Pole Bases and delete the paragraph.
<b>Subsection:</b>	716.04.04 Pole Bases.
Revision:	Insert the following:
	A. Pole Base. The Department will measure the quantity as each individual unit furnished
	and installed. The Department will not measure excavation, concrete, conduits, fittings, ground
	rods, ground wires, ground lugs, reinforcing steel, restoring disturbed areas to the satisfaction
	of the Engineer, and any associated hardware for payment and will consider them incidental to
	this item of work.
	B. Pole Base High Mast. The Department will measure the quantity in cubic yards
	furnished and installed. The Department will not measure excavation, concrete, conduits,
	fittings, ground rods, ground wires, ground lugs, reinforcing steel, restoring disturbed areas to
	the satisfaction of the Engineer, and any associated hardware for payment and will consider
	them incidental to this item of work.

Subsection	716.04.05 Pole Base in Median Wall.
Revision:	Replace the last sentence with the following: The Department will not measure conduits, fittings, junction boxes, additional reinforcing steel, ground rods, ground wire, ground lugs,
	and aluminum cover plates (if specified) for payment, and will consider them incidental to this item of work.
<b>Subsection:</b>	716.04.06 Transformer Base.
Revision:	Replace the last sentence with the following: The Department will not measure transformer door, ground lug, anchoring bolts, nuts, washers, and any associated hardware for payment and will consider them incidental to this item of work. The filling of any unused holes will also be considered incidental to this item of work.
<b>Subsection:</b>	716.04.07 Pole with Secondary Equipment.
Revision:	Replace the heading with the following: 716.04.07 Pole with Secondary Control Equipment.
<b>Subsection:</b>	716.04.07 Pole with Secondary Control Equipment.
Revision:	Replace the second and third sentence with the following: The Department will not measure mounting the cabinet to the pole, backfilling, restoration, any necessary hardware to anchor pole, electrical inspection fees, and required building fees involving utility secondary, and primary service for payment 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, ground lugs, and ground wires for payment and will consider them incidental to this item of work. The filling of unused holes will also be considered incidental to this item of work.
<b>Subsection:</b>	716.04.08 Lighting Control Equipment.
Revision:	Replace the paragraph with the following:  The Department will measure the quantity as each individual unit furnished and installed. The
	Department will not measure the concrete base, excavation, backfilling, restoration, any necessary anchors, electrical inspection fees, and required building fees involving utility secondary/primary service for payment 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, ground lugs, and ground wires for payment and will consider them incidental to this item of work. The Department will not measure the filling of any unused holes with and will consider them incidental to this item of work.
<b>Subsection:</b>	716.04.09 Luminaire.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each individual unit furnished and installed. The Department will not measure lamps, starters, ballasts, drivers, surge protection, dimming modules, photo-control receptacle, specified shielding (if required), and any adjustments necessary to provide the desired lighting pattern for payment and will consider them incidental to this item of work.
Subsection:	716.04.10 Fused Connector Kits.
Revision:	Replace the heading with the following: 716.04.10 Fuse Connector Kits.

Cubaadian	716.04.10 Fuse Connector Kits.			
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each			
Revision:	individual unit furnished and installed. The Department will not measure fuses/lugs for			
	payment and will consider them incidental to this item of work.			
	payment and will consider them incidental to this item of work.			
<b>Subsection:</b>	716.04.11 Conduit.			
Revision:	Replace the second sentence with the following: The Department will not measure installation			
	in ground or on structures, conduit fittings, test plugs, expansion joints with bonding straps,			
	grounding lugs, drill anchors, clamps, and any additional hardware required for payment and			
	will consider them incidental to this item of work.			
	716.04.12 Markers.			
<b>Revision:</b>	Replace the section with the following: The Department will measure the quantity as each			
G 1 4	individual unit furnished and installed.			
	716.04.13 Junction Box.			
Revision: Subsection:	Replace the subsection title with the following: Electrical Junction Box Type Various.  716.04.13 Electrical Junction Box Type Various.			
Revision:	Replace the section with the following: The Department will measure the quantity as each			
Revision:	individual unit furnished and installed. The Department will not measure additional junction			
	boxes for greater depths than those identified in Plans, #57 aggregate, backfilling, restoration of			
	disturbed areas to the satisfaction of the Engineer, geotextile filter fabric, concrete, hot dipped			
	galvanized cover, stainless steel screws, rubber gasket, and any associated hardware for			
	payment, and will consider them incidental to this item of work.			
<b>Subsection:</b>	716.04.13 Junction Box.			
Part:	A) Junction Electrical.			
<b>Revision:</b>	Delete Part A.			
<b>Subsection:</b>	716.04.14 Trenching and Backfilling.			
Revision:	Replace the section with the following: The Department will measure the quantity in linear			
	feet. The Department will not measure excavation, backfilling, underground utility warning			
	tape (if required), and the restoration of disturbed areas to original condition for payment and			
G 1	will consider them incidental to this item of work.			
	716.04.15 Wire or Cable.			
<b>Revision:</b>	Replace the section with the following: The Department will measure the quantity in linear feet furnished and installed. The Department will not measure installation within conduit, splice			
	furnished and installed. The Department will not measure installation within conduit, splice boots, and any other hardware required for installing cable for payment and will consider them			
	incidental to this item of work.			
<b>Subsection:</b>	716.04.16 Ducted Cable.			
Revision:	Replace the second sentence of the paragraph with the following: The Department will not			
TTO ( IDIOII)	measure installation within trench or conduit and any other necessary hardware for payment			
	and will consider them incidental to this item of work.			
<b>Subsection:</b>	716.04.17 Temporary Lighting			
<b>Revision:</b>	Rename the subsection as follows: 716.04.17 Temporary Lighting/Maintain Lighting.			

Subsection:	716.04.17 Temr	orary Lighting/Maintain Lighting.				
	_	graph and add the following parts:				
Tto Vision.		gighting. The Department will measure	are the quantity by lump sum. The			
	, .	not measure poles, luminaires, wire,				
	_	-	(in (if required), and any other necessary			
	* *		at and will consider them incidental to this			
	item of work.	te a complete installation for paymen	te und will consider them meldental to this			
	B) Maintain Lighting. The Department will measure the quantity by lump sum. The					
	Department will not measure maintenance of lighting elements and design (if required) for					
		Il consider them incidental to this iter				
	716.04.18 Remo		III OI WOIK.			
			partment will measure the quantity by lump			
		rtment will not measure backfilling a				
			ral or electrical component of the lighting			
		the contract of the contract o	, junction boxes, cabinets, and wood poles			
	,	will consider them incidental to this				
	r pug i i i i					
<b>Subsection:</b>	716.04.19 Rem	ove Pole Base.				
<b>Revision:</b>	Delete Subsection	on.				
<b>Subsection:</b>	716.04.20 Bore	and Jack Conduit.				
<b>Revision:</b>	Renumber Subs	ection to 716.04.19 Bore and Jack Co	onduit.			
<b>Subsection:</b>	716.04.19 Bore	and Jack Conduit.				
<b>Revision:</b>	Replace the para	agraph with the following: The Depar	rtment will measure the quantity in linear			
	feet. This item shall include all work necessary for boring and installing conduit under an					
	existing roadway.					
<b>Subsection:</b>	716.05 PAYME	NT.				
<b>Revision:</b>	Revise the follow	wing under <u>Code</u> , <u>Pay Item</u> , and <u>Pay</u>	<u>Unit</u> with the following:			
	<u>Code</u>	Pay Item	Pay Unit			
	04700-04701	Pole(Various)Mtg Ht	Each			
	04710-04714	Pole(Various)Mtg Ht High Mast	Each			
	04810-04811	Electrical Junction Box (Various)	Each			
	20391NS835	Electrical Junction Box Type A	Each			
	20392NS835	Electrical Junction Box Type C	Each			
	04770-04773	Luminaire (Various)	Each			
	04780	Fuse Connector Kit	Each			
	20410ED	Maintain Lighting	Lump Sum			
	04941	Remove Pole Base	<del>- Each</del>			
	723.02.02 Paint.					
	Replace sentence with the following: Conform to Section 821.					
Revision:	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,					
	723.03.02 Poles and Bases Installation.					
<b>Revision:</b>	Replace the title	with the following: 723.03.02 Pole	and Base Installation.			

	723.03.02 Pole and Base Installation.	
	Replace the first paragraph 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. Orient the handhole door away from traffic travel	
	path. If pole base is installed within a sidewalk the top of the pole base shall be the same grade	
	as the sidewalk.	
	723.03.02 Poles and Bases Installation.	
	A) Steel Strain and Mastarm Poles Installation	
	Replace the title of Part A) Steel Strain and Mast Arm Pole Installation.	
	723.03.02 Pole and Base Installation.	
	A) Steel Strain and Mast Arm Pole Installation.	
Revision:	Insert the following sentence at the beginning of the first paragraph: Install pole bases 4 to 6	
	inches above grade.	
	723.03.02 Pole and Base Installation.	
	A) Steel Strain and Mast Arm Pole Installation.	
<b>Revision:</b>	Replace the second paragraph with the following: For concrete base installation, see Subsection	
	716.03.02 B), 2), Paragraphs 2-6. 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 Pole and Base Installation.	
Part:	B) Pedestal or Pedestal Post Installation.	
Revision:	Replace the second sentence with the following: If over 12 feet high the base shall have the	
	minimum depth and diameter as Subsection 716.03.02 (A), paragraph 2.	
<b>Subsection:</b>	723.03.02 Poles and Bases Installation.	
Part:	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.	
<b>Subsection:</b>	723.03.03 Trenching.	
	Replace the first sentence with the following: See Subsection 716.03.03 (B).	
	723.03.03 Trenching.	
Part:	A) Under Roadway.	
	Delete Part A) Under Roadway.	
	723.03.05 Conduit Requirements in Junction Boxes.	
<b>Revision:</b>	Delete the Subsection and replace with the following:	
	723.03.05 Fuse Connector Kits. See Subsection 716.03.09.	
	723.03.06 Coupling Installation.	
Revision:	Delete the Subsection and replace with the following:	
	723.03.06 Painting. See Subsection 716.03.15.	
	723.03.07 Bonding Requirements.	
<b>Revision:</b>	Delete the Subsection and replace with the following:	
	723.03.07 Electrical Junction Boxes. See Subsection 716.03.10.	

Subsection:723.03.08 Painting.Revision:Replace with 723.03.06 Painting. See Subsection:Subsection:723.03.09 Underground Warning Tape.Revision:Renumber Subsection to 723.03.08 Underground Warning Tape.	section 716.03.15.
Subsection: 723.03.09 Underground Warning Tape. Revision: Renumber Subsection to 723.03.08 Undergo	section 716.03.15.
<b>Revision:</b> Renumber Subsection to 723.03.08 Undergo	
	<u> </u>
<b>Subsection:</b> 723.03.10 Backfilling and Disturbed Areas	3.
<b>Revision:</b> Renumber Subsection to 723.03.09 Backfi	lling and Disturbed Areas.
<b>Subsection:</b> 723.03.11 Wiring Installation.	
<b>Revision:</b> Renumber Subsection to 723.03.10 Wiring	Installation.
<b>Subsection:</b> 723.03.10 Wiring Installation.	
	fth and sixth sentences: Provide an extra two feet of
	duit in poles, pedestals, and junction boxes.
The state of the s	
<b>Subsection:</b> 723.03.12 Loop Installation.	
<b>Revision:</b> Renumber Subsection to 723.03.11 Loop I	nstallation.
<b>Subsection:</b>   723.03.11 Loop Installation.	
•	agraph with the following: Provide an extra two feet
of loop wire and lead-in past the installed of	conduit in poles, pedestals, and junction boxes.
Subsection: 723.03.13 Grounding Installation.	
<b>Revision:</b> Renumber Subsection to 723.03.12 Ground	ding Installation.
<b>Subsection:</b> 723.03.12 Grounding Installation.	
<b>Revision:</b> Replace the reference to "Standard Detail S	Sheets" in the first sentence with "Plans".
<b>Subsection:</b> 723.03.14 Splicing.	
<b>Revision:</b> Renumber Subsection to 723.03.13 Splicing	g.
<b>Subsection:</b> 723.03.13 Splicing.	
<b>Revision:</b> Delete the reference to (IMSA 19-2) from	the 5th sentence of the paragraph.
<b>Subsection:</b> 723.03.15 Painting.	
<b>Revision:</b> Delete Subsection.	
<b>Subsection:</b> 723.03.14 Splicing.	
<b>Revision:</b> Replace with new Subsection 723.03.14 Re	emove Signal Equipment.
<b>Subsection:</b> 723.03.14 Remove Signal Equipment.	
	: Remove all traffic signal equipment that is
S.	essary including, but not limited to, the following:
	wood poles, and advance warning flashers. Pole
	foot below finished grade by chipping off or other
	Dispose of all removed concrete off right-of-way.
	of one foot below finished grade. Backfill holes with
	nit may be abandoned in the ground. Contact the
	removed signal equipment needs to be returned to
the district and to determine the location/ti	me for such defiveries.
G. 1	
Subsection: 723.05.16 Drawings.	
<b>Revision:</b> Renumber the Subsection to 723.03.15 Dra	awings.

<b>Subsection:</b>	723.03.15 Drawings.					
Revision:	Replace Subsection with the following: Before final inspection of the traffic control device,					
110 (151011)	provide a complete set of reproducible as-built drawings that show the arrangement and					
	locations of all equipment including: junction boxes, conduits, spare conduits, etc. Keep a					
	daily record of all conduits placed in trenches, showing the distance from the pavement edge,					
	the depth, and the length of runs, and indicate this information on the as-built drawings.					
	the depair, and the length of runs, and maleute this information on the as built drawings.					
<b>Subsection:</b>	723.03.17 Acceptance and Inspection Requirements.					
Revision:	Renumber Subsection to 723.03.16 Acceptance and Inspection Requirements.					
<b>Subsection:</b>	723.03.16 Acceptance and Inspection Requirements.					
Revision:	Replace the first paragraph of the section with the following: See Subsection 105.12. In					
	coordination with the District Traffic Engineer, energize traffic control device as soon as it is					
	fully functional and ready for inspection. After the work has been completed, conduct an					
	operational test demonstrating that the system operates in accordance with the Plans in the					
	presence of the Engineer. The Department will also conduct its own tests with its own					
	equipment before final acceptance. Ensure that the traffic control device remains operational					
	until the Division of Traffic Operations has provided written acceptance of the electrical work.					
	723.04.01 Conduit.					
<b>Revision:</b>	Replace the second sentence of the subsection with the following: The Department will not					
	measure conduit fittings, ground lugs, test plugs, expansion joints, and clamps for payment and					
	will consider them incidental to this item of work.					
<b>Subsection:</b>	723.04.02 Junction Box.					
Revision:	Replace subsection title with the following: Electrical Junction Box Type Various.					
<b>Subsection:</b>	<b>₹1</b>					
Revision:	Replace the subsection with the following: The Department will measure the quantity as each					
	individual unit furnished and installed. The Department will not measure additional junction					
	boxes for greater depths than those identified in Plans, Aggregate (#57), backfilling, restoration					
	of disturbed areas to the satisfaction of the Engineer, geotextile fabric, concrete, hot dipped					
	galvanized cover, stainless steel screws, rubber gasket, and any associated hardware for					
Subsection	payment and will consider them incidental to this item of work.  723.04.03 Trenching and Backfilling.					
Revision:	Replace the second sentence with the following: The Department will not measure excavation,					
Kevision.	backfilling, underground utility warning tape, and the restoration of disturbed areas to original					
	condition for payment and will consider them incidental to this item of work.					
	condition for payment and will consider them metachtar to this item of work.					
Subcotion	723.04.04 Open Cut Roadway.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
Kevisiuli:	measure concrete, reinforcing steel, and asphalt for payment and will consider them incidental					
	to this item of work.					
Subsection	723.04.05 Loop Wire.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
ICCAISIOII:	measure splice boots, cable rings, and any other necessary hardware for payment and will					
	consider them incidental to this item of work.					
Subsection	723.04.06 Cable.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
ACVISIUII.	measure splice boots, cable rings, and any other hardware for payment and will consider them					
	incidental to this item of work.					
	meldenar to and tent of work,					

<b>Subsection:</b>	723.04.07 Pole-Wooden.					
<b>Revision:</b>	Replace the second sentence of the subsection with the following: The Department will not					
	measure excavation, backfilling, and restoring disturbed areas for payment and will consider					
	them incidental to this item of work.					
<b>Subsection:</b>	723.04.08 Steel Strain Pole.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure excavation, backfilling, and restoring disturbed areas for payment and will consider					
	them incidental to this item of work.					
	723.04.09 Mast Arm Pole.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure anchor bolts, arms, mounting brackets, and any other necessary hardware for payment					
~ -	and will consider them incidental to this item of work.					
	723.04.10 Signal Pedestal.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure excavation, concrete, reinforcing steel, conduits, fittings, ground rods, ground wire,					
	ground lugs, backfilling, restoring disturbed areas, and other necessary hardware for payment					
	and will consider them incidental to this item of work.					
Subsection	723.04.11 Post.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
Revision.	measure excavation, backfilling, and restoring disturbed areas for payment and will consider					
	them incidental to this item of work.					
Subsection:	723.04.12 Anchor.					
<b>Revision:</b>	Replace the second sentence of the subsection with the following: . The Department will not					
	measure down-guy, messenger, clamps, guy guard, or insulators, and possible installation in					
	various soil conditions for payment and will consider them incidental to this item of work.					
<b>Subsection:</b>	723.04.13 Messenger.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure strand vises, bolts, washers, and other necessary hardware for payment and will					
	consider them incidental to this item of work.					
	723.04.14 Install Signal LED.					
Revision:	Revise subsection title to 723.04.14 Install Beacon Controller - 2 Circuit.					
<b>Subsection:</b>	723.04.14 Install Beacon Controller - 2 Circuit.					
Revision:	Replace the subsection with the following: The Department will measure the quantity as each					
	individual unit furnished and installed. The Department will not measure the controller					
	housing, mounting equipment, S5-1 school zone sign, time clock, nema flasher, ground rods,					
	ground wires, ground lugs, metering disconnect hardware, electrical inspection fees, and					
	required building fees involving utility secondary/primary service for payment and will					
	consider them incidental to this item of work.					

Subsection:	723.04.15 Loop Saw Slot and Fill.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
110 (151011)	measure sawing, cleaning, filling induction loop saw slot, loop sealant, backer rod, drilling hole					
	for conduit, and grout for payment and will consider them incidental to this item of work.					
<b>Subsection:</b>						
Revision:	Replace the subsection 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 signs, detector housing, and installing mounting hardware for sign					
	for payment and will consider them incidental to this item of work.					
<b>Subsection:</b>	723.04.17 Signal.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure furnishing and installing LED modules, retroreflective tape, back plates, and any other					
	hardware for payment 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 of the subsection with the following: The Department will not					
	measure the concrete base, mounting the cabinet, connecting the signal and detectors,					
	excavation, backfilling, restoration, any necessary pole mounting hardware, electric service,					
	electrical inspection fees, and building fees involving secondary/primary service for payment					
	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, electrical service conductors, conduits, anchors, meter base, fused					
	cutout, fuses, ground rods, ground wires, and ground lugs for payment and will consider them					
	incidental to this item of work.					
<b>Subsection:</b>	723.04.19 Beacon Controller - 2 Circuit.					
Revision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure the controller housing, mounting equipment, S5-1 school zone sign, time clock, nema					
	flasher, ground rods, ground wires, ground lugs, metering disconnect hardware, electrical					
	inspection fees, and required building fees involving utility secondary/primary service for					
	payment and will consider them incidental to this item of work.					
	723.04.20 Install Signal Controller - Type 170.					
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each					
	individual unit installed. The Department will not measure the concrete base, mounting the					
	cabinet, connecting the signal and detectors, excavation, backfilling, restoration, any necessary					
	pole mounting hardware, electric service, electrical inspection fees, and required building fees					
	involving utility secondary/primary service for payment 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 for payment and will					
	consider them incidental to this item of work. The Department will also not measure furnishing					
	and installing electrical service conductors, conduits, anchors, meter base, fused cutout, fuses,					
	ground rods, ground lugs, and ground wires for payment and will consider them incidental to					
Subsection:	this item of work. 723.04.21 Install Steel Strain Pole.					
Subsection: Revision:						
Kevision:	Replace the second sentence of the subsection with the following: The Department will not					
	measure any necessary clamp assemblies for payment and will consider them incidental to this item of work.					
	nem of work.					

<b>Subsection:</b>	723.04.22 Remove Signal Equipment.					
Revision:	Replace the paragraph with the following: The Department will measure the quantity by lump sum. The Department will not measure backfilling and the disposal or transportation of equipment and materials associated with any structural or electrical component of the signal system including, but not limited to pole bases, poles, junction boxes, cabinets, and wood poles for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.23 Install Span/Pole Mounted Sign. Replace the second sentence of the subsection with the following: The Department will not measure the hanger or any other hardware necessary to install the sign for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.24 Install Pedestrian Head LED. Insert the following sentence at the end of the paragraph: The Department will not measure the installation of LED modules and any other necessary hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.25 Install Signal LED. Insert the following sentence at the end of the paragraph: The Department will not measure the installation of LED modules, retroreflective tape, back plates, and any other necessary hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.26 Install Coordinating Unit.  Replace the subsection with the following: The Department will measure the quantity as each individual unit installed. The Department will not measure radio, modem, cable(s), antenna(s), router, repeater, and any other necessary hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.27 Video Camera.  Replace the second sentence of the subsection with the following: The Department will not measure video modules, mounting bracket, truss type arm, power cable, coaxial cable, and any other necessary hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.28 Install Pedestrian Detector Audible. Replace the second sentence with the following: The Department will not measure installing R10-3e sign, detector housing, and installing mounting hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.29 Audible Pedestrian Detector. Replace the second sentence with the following: The Department will not measure furnishing and installing the R10-3e sign, detector housing, and installing mounting hardware for payment and will consider them incidental to this item of work.					
Subsection: Revision:	723.04.30 Bore and Jack Conduit.  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.					

Cubactions	723.04.31 Install Pedestrian Detector.
Revision:	Replace the paragraph with the following: The Department will measure the quantity as each
Revision:	
	individual unit installed and connected to pole/pedestal. The Department will not measure
	installing R 10-3e sign, detector housing, and installing mounting hardware for payment and
G 1	will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.32 Install Mast Arm Pole.
Revision:	Replace the second sentence with the following: The Department will not measure installation
	of arms, signal mounting brackets, anchor bolts, and any other necessary hardware for payment
	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,
	backfilling, restoration, furnishing and installing concrete, reinforcing steel, anchor bolts,
	conduit, fittings, ground rod, ground wire, ground lugs, or any other necessary hardware for
	payment and will consider them incidental to this item of work.
	reg a single sin
<b>Subsection:</b>	723.04.34 Span Mounted Sign.
Revision:	Revise subsection title to 723.04.34 Span/Pole-Mounted Sign.
	723.04.34 Span/Pole-Mounted Sign.
Revision:	Replace the second sentence of the subsection with the following: The Department will not
	measure the hanger, sign, and any other necessary hardware for payment and will consider
	them incidental to this item of work.
<b>Subsection:</b>	723.04.35 Remove and Reinstall Coordinating Unit.
Revision:	Add the following sentence to the end of the subsection: The Department will not measure
	removing, storage, reinstalling, and connecting radio, modem, cable(s), antenna(s), router,
	repeater, and any other necessary hardware for payment and will consider them incidental to
	this item of work.
<b>Subsection:</b>	723.04.36 Traffic Signal Pole Base.
Revision:	Replace the second sentence of the subsection with the following: The Department will not
	measure excavation, backfilling, restoration, furnishing and installing reinforcing steel, anchor
	bolts, conduits, ground rods, ground wires, and ground lugs for payment and will consider
	them incidental to this item of work.
<b>Subsection:</b>	723.04.37 Install Signal Pedestal.
Revision:	Replace the second sentence of the subsection with the following: . The Department will not
	measure excavation, backfilling, restoration, furnishing and installing concrete, reinforcing
	steel, conduits, fittings, ground rod, ground wire, ground lugs, and any other necessary
	hardware for payment and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.38 Install Pedestal Post.
Revision:	Replace the second sentence of the subsection with the following: The Department will not
	measure excavation, backfilling, restoration, furnishing and installing concrete, reinforcing
	steel, conduit, fittings, ground rod, ground wire, ground lugs, and any other necessary hardware
	for payment and will consider them incidental to this item of work.
<b>Subsection:</b>	723.04.39 Install Antenna.
Revision:	Replace the second sentence of the subsection with the following: The Department will not
TTC VISIOII.	measure any other materials necessary to complete the installation for payment and will
	consider them incidental to this item of work.
	vonsider them incidental to this item of work.

Subsection:	723.05 PAYMENT.					
Revision:	Replace items 04810-04811, 20391NS835, 20392NS835,23052NN and add item number					
ACVISION.	24526ED under Code, Pay Item, and Pay Unit with the following:					
	2 10 20 DD under <u>code</u> , <u>ray teem</u> , and <u>ray one</u> with the ronowing.					
	Code Pay Item Pay Unit					
	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					
	23052NN Span/Pole-Mounted Sign Each					
	24526ED Install Beacon Controller 2 Cir Each					
Subsection	801.01 REQUIREMENTS					
Revision:	Replace first sentence in paragraph one with the following: Provide Portland cement or					
Kevision.	blended hydraulic cement from approved mills listed in the Department's List of Approved					
	Materials.					
<b>Subsection:</b>						
Number:	1)					
Revision:	Replace first sentence with the following: Type I, II, III, and IV <i>Portland cement</i> conforms to					
Revision:	ASTM C 150.					
Subsections						
Number:	801.01 REQUIREMENTS 3)					
Revision:	Replace the first sentence with the following: Type IP (<20), Portland-pozzolan cement,					
Revision:						
	conforms to ASTM C595, and the following additional requirements to Type IP (≤20).					
Cubaadian	801.01 REQUIREMENTS					
Number:						
Part:	3)					
	b)					
Revision:	Delete part b)					
Number:	801.01 REQUIREMENTS					
	3)					
Part: Revision:	C)					
Revision:	Rename Part c) to Part b) and replace the text with the following: The cement manufacturer					
	shall furnish to the Engineer reports showing the results of tests performed on the fly ash used					
	in the manufacture of the Type IP(≤20) cement shipped to the project.					
Subsection	801.01 REQUIREMENTS					
Number:	3)					
Part:	d)					
<b>Revision:</b>	Rename Part d) to Part c)					
Number:	3)					
Part:	e)					
<b>Revision:</b>	Rename Part e) to Part d) and replace the text with the following: Use only one brand of Type					
	IP(≤20) cement throughout the project, unless the Engineer approved a change in brand in					
	writing.					
Number:	4)					
Revision:	Replace first sentence with the following: Type IS(≤30), Portland blast furnace slag cement,					
	conforms to ASTM C 595 and the following requirements:					

	801.01 REQUIREMENTS					
Number:	4)					
Part:	a)					
<b>Revision:</b>	Replace part a) with the following: Use Grade 100 or 120 blast furnace slag cement					
	conforming to the requirements of ASTM C 989.					
<b>Subsection:</b>	801.01 REQUIREMENTS					
Number:	4)					
Part:	b)					
Revision:	Delete part b)					
	801.01 REQUIREMENTS					
Number:	4)					
Part:	c)					
Revision:						
Revision:	Rename Part c) to Part b) and replace the text with the following: The cement manufacturer					
	shall furnish to the Engineer reports showing the results of the tests performed on the blast					
	furnace slag cement used in the manufacturing of the Type IS(≤30) shipped to the project.					
<b>Subsection:</b>	801.01 REQUIREMENTS					
Number:	4)					
Part:	d)					
Revision:	Rename Part d) to Part c)					
	801.01 REQUIREMENTS					
Number:	4)					
Part:						
Revision:	e) Rename Part e) to Part d) and replace the text with the following: Use only one brand of Type					
Revision:	, , , ,					
	IS(≤30) cement throughout the project, unless the Engineer approves otherwise.					
G 1	201 01 PEOLIPE (ENTE					
	801.01 REQUIREMENTS					
Number:	5)					
<b>Revision:</b>	Insert part 5) as the following: Type IL(5-15), Portland-limestone cement, conforms to ASTM					
	C 595 and the following additional requirements:					
	801.01 REQUIREMENTS					
Number:	5)					
Part:	a)					
Revision:	Insert part a) as the following: The cement manufacturer shall furnish to the Engineer reports					
	showing the results of test performed on the limestone used in the manufacture of the Type IL					
	cement shipped to the project.					
<b>Subsection:</b>	801.01 REQUIREMENTS					
Number:	5)					
Part:	b)					
<b>Revision:</b>	Insert part b) as the following: Use only one brand of Type IL cement throughout the project,					
	unless the Engineer approves a brand change in writing.					
<b>Subsection:</b>	801.01 REQUIREMENTS					
Number:	5)					
Part:	c)					
Revision:	Insert part c) as the following: The Type IL blended cement shall be an intimate and uniform					
ICVISIUII.	blend produced by intergrinding of the Portland cement and limestone.					
Subsections	804.01.02 Crushed Sand.					
<b>Revision:</b>	Delete last sentence of the section.					

Subsection	804.01.06 Slag.						
Revision:							
Kevision.	Add subsection and following sentence.						
	Provide blast furnace slag sand where permitted. The Department will allow steel slag sand only in asphalt surface applications.						
Subsection:							
	1						
<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.						
<u> </u>	000 02 01 0						
	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 $J_{NR}$ (non-recoverable creep compliance) between 0.1 and 0.5, when tested according to						
	AASHTO TP 70.						
	806.03.01 General Requirements.						
Table:	PG Binder Requirements and Price Adjustment Schedule						
<b>Revision:</b>	Replace the Elastic Recovery, % (3) (AASHTO T301) and all corresponding values in the table						
	with the following:						
	Test Specification 100% Pay 90% Pay 80% Pay 70% Pay 50% Pay						
	MSCR recovery, % <sup>(3)</sup> 60 Min. ≥58 56 55 54 <53						
	(AASHTO TP 70)						
<b>Subsection:</b>	806.03.01 General Requirements.						
Table:	PG Binder Requirements and Price Adjustment Schedule						
Superscript	(3)						
<b>Revision:</b>	Replace (3) with the following:						
	Perform testing at 64°C.						
<b>Subsection:</b>	808.07 Polypropylene Waterproofing Membrane.						
<b>Revision:</b>	Replace the paragraph and table with the following: Furnish a layered waterproofing						
	membrane. The layers will consist of an internal puncture resistant woven polypropylene fabric						
	sandwiched between two rubberized mastic layers. The mastic will have a heavy polyethylene						
	membrane attached on the top and the bottom mastic layer will be covered by a protective						
	release film.						
<b>Subsection:</b>	808.09 Acceptance.						
<b>Revision:</b>	Replace the reference to "KMIMS" in the second paragraph with SiteManager.						
	811.10.04 Properties of the Coated Bar.						
Part:	B) Flexibility of Coating.						
<b>Revision:</b>	Replace the second sentence of the paragraph with the following: Ensure that the coated bars						
	are capable of being bent to 180 degrees (after rebound) over a mandrel, without any visible						
	evidence of cracking the coating.						
<b>Subsection:</b>	813.04 Gray Iron Castings.						
<b>Revision:</b>	Replace the reference to "AASHTO M105" with "ASTM A48".						
<b>Subsection:</b>							
Number:	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.					
Revision:	Third paragraph, replace the reference to "AWPA C14" with "AWPA U1, Section B,					
	Paragraph 4.1".					
Revision:	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.					
Revision:	Fourth paragraph, replace the reference to "AWPA C2" with "AWPA U1, Section B,					
	Paragraph 4.1".					
	814.04.02 Timber Guardrail Posts.					
	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.					
	816.07.02 Wood Posts and Braces.					
Revision:	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.					
	818.07 Preservative Treatment.					
<b>Revision:</b>	First paragraph, replace all references to "AWPA C14" with "AWPA U1, Section A".					
Subsection:	833.01.02 Sheeting Signs.					
	Replace the second sentence with the following: Provide a thickness of 125 mils if any single					
ACVISION.	edge dimension of the sign exceeds 3 feet.					
Subsection						
Revision:	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).					
	834.14.03 High Mast Poles.					
	Remove the second and fourth sentence from the first paragraph.					
	834.14.03 High Mast Poles.					
<b>Revision:</b>	Replace the third paragraph with the following: Provide calculations and drawings that are					
	stamped by a Professional Engineer licensed in the Commonwealth of Kentucky.					

Subsection: Revision:

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).

**Subsection:** 

834.16 ANCHOR BOLTS.

**Revision:** 

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.

**Subsection:** 

834.17.01 Conventional.

**Revision:** 

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.

Subsection

**Subsection:** | 834.21.01 Waterproof Enclosures.

**Revision:** 

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.

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	835.07 Traffic Poles.			
Revision:	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.			
Revision:	*Replace the first sentence of the fourth paragraph with the following: Ensure transverse plates			
	have a thickness ≥ 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.			
	835.07 Traffic Poles.			
Revision:	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.			
Subsection: Revision:	835.07 Traffic Poles.  *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.			
Revision:	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.			
	835.07.01 Steel Strain Poles.			
Revision:	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			
<b>a.</b>	category and example from table 11.9.3.1-1.			
	835.07.02 Mast Arm Poles.			
Revision:	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.			

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	835.07.02 Mast Arm Poles.						
Revision:	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						
G 1 4°	category and example from table 11.9.3.1-1.						
	835.07.03 Anchor Bolts						
Revision:		e end of the paragraph: There shall					
		of the anchor bolt when designed i					
		Templates shall be contained within a 26.5 inch diameter. All templates shall be fully					
	galvanized (ASTM A 1	· ·					
	835.16.05 Optical Units						
Revision:	Replace the 3rd paragra						
		ducts can be found on the following	website: http://www.intertek.com.				
<b>Subsection:</b>	835.19.01 Pedestrian De	-					
<b>Revision:</b>	•	ce with the following: Provide a fou	*				
		t is compatible with the pedestrian d	letector.				
<b>Subsection:</b>	843.01.01 Geotextile Fa	abric.					
Table:	TYPE I FABRIC GEOT	TEXTILES FOR SLOPE PROTECT	ΓΙΟΝ AND CHANNEL LINING				
<b>Revision:</b>	Add the following to the	e chart:					
	Property	Minimum Value <sup>(1)</sup>	Test Method				
	CBR Puncture (lbs)	494	ASTM D6241				
	Permittivity (1/s)	0.7	ASTM D4491				
	(175)	,	110 1111 2 1 101				
<b>Subsection:</b>	843.01.01 Geotextile Fa	ıbric.					
Table:	TYPE II FABRIC GEO	TEXTILES FOR UNDERDRAINS					
Revision:	Add the following to the	e chart:					
	Property	Minimum Value <sup>(1)</sup>	Test Method				
	CBR Puncture (lbs)	210	ASTM D6241				
	Permittivity (1/s)	0.5	ASTM D4491				
	(175)	0.5	1151111 5 1171				
Subsection:	843.01.01 Geotextile Fa	ıbric.					
Table:	TYPE III FABRIC GEO	OTEXTILES FOR SUBGRADE OF	R EMBANKMENT				
	STABILIZATION						
<b>Revision:</b>	Add the following to the	e chart:					
	Property	Minimum Value <sup>(1)</sup>	Test Method				
	CBR Puncture (lbs)	370	ASTM D6241				
	Permittivity (1/s)	0.05	ASTM D0241 ASTM D4491				
	1 0111111111111111111111111111111111111	0.03	ASTWI D4471				
Subsection:	843.01.01 Geotextile Fa	abric.					
Table:	TYPE IV FABRIC GEOTEXTILES FOR EMBANKMENT DRAINAGE BLANKETS AND						
	PAVEMENT EDGE DRAINS						
Revision:	Add the following to the	· · <del>-</del>					
( 1DIVII)	Property	Minimum Value <sup>(1)</sup>	Test Method				
		309	ASTM D6241				
	CBR Puncture (lbs) Permittivity (1/s)	0.5	ASTM D0241 ASTM D4491				

**Subsection:** 843.01.01 Geotextile Fabric.

 Table:
 TYPE V HIGH STRENGTH GEOTEXTILE FABRIC

**Revision:** Make the following changes to the chart:

PropertyMinimum Value(1)Test MethodCBR Puncture (lbs)618ASTM D6241

Apparent Opening Size U.S. #40<sup>(3)</sup> ASTM D4751

(3) Maximum average roll value.

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#### 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:

- Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
- 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.
- 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.
- 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.

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- 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:

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

\*Insert numerals as directed by the Engineer.

Add other messages during the project when required by the Engineer.

#### 2.3 Power.

- 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

1I

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:

CodePay ItemPay Unit02671Portable Changeable Message SignEach

Effective June 15, 2012

11F

#### SPECIAL NOTE FOR TURF REINFORCING MAT

**1.0 DESCRIPTION.** Install turf reinforcement mat at locations specified in the Contract or as the Engineer directs. Section references herein are to the Department's 2008 Standard Specifications for Road and Bridge Construction.

#### 2.0 MATERIALS.

- 2.1 Turf Reinforcement Mat (TRM). Use a Turf Reinforcement Mat defined as permanent rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a three-dimensional matrix of sufficient thickness and from the Department's List of Approved Materials. Mats must be 100% UV stabilized materials. For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting exclusively. Ensure product labels clearly show the manufacturer or supplier name, style name, and roll number. Ensure labeling, shipment and storage follows ASTM D-4873. The Department will require manufacturer to provide TRMs that are machine constructed web of mechanically or melt bonded nondegradable fibers entangled to form a three dimensional matrix. The Department will require all long term performance property values in table below to be based on non degradable portion of the matting alone. Approved methods include polymer welding, thermal or polymer fusion, or placement of fibers between two high strength biaxially oriented nets mechanically bound by parallel stitching with polyolefin thread. Ensure that mats designated in the plans as Type 4 mats, are not to be manufactured from discontinuous or loosely held together by stitching or glued netting or composites. Type 4 mats shall be composed of geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems and with high tensile modulus. The Department will require manufacturer to use materials chemically and biologically inert to the natural soil environments conditions. Ensure the blanket is smolder resistant without the use of chemical additives. When stored, maintain the protective wrapping and elevate the mats off the ground to protect them from damage. The Department will not specify these materials for use in heavily acidic coal seam areas or other areas with soil problems that would severally limit vegetation growth.
  - A) Dimensions. Ensure TRMs are furnished in strips with a minimum width of 4 feet and length of 50 feet.
  - B) Weight. Ensure that all mat types have a minimum mass per unit area of 7 ounces per square yard according to ASTM D 6566.
  - C) Performance Testing: The Department will require AASHTO's NTPEP index testing. The Department will also require the manufacturer to perform internal MARV testing at a Geosynthetic Accreditation Institute Laboratory Accreditation Program (GAI-LAP) accredited laboratory for tensile strength, tensile elongation, mass per unit area, and thickness once every 24,000 yds of production or whatever rate is required to ensure 97.7% confidence under ASTM D4439& 4354. The Department will require Full scale testing for slope and channel applications shear stress shall be done under ASTM D 6459, ASTM D 6460-07 procedures.

#### 2.2 Classifications

The basis for selection of the type of mat required will be based on the long term shear stress level of the mat of the channel in question or the degree of slope to protect and will be designated in the contract. The Type 4 mats are to be used at structural backfills protecting critical

structures, utility cuts, areas where vehicles may be expected to traverse the mat, channels with large heavy drift, and where higher factors of safety, very steep slopes and/or durability concerns are needed as determined by project team and designer and will be specified in the plans by designer.

Turf Reinforcement Matting					
Properties <sup>1</sup>	Type 1	Type 2	Type 3	Type 4	Test Method
Minimum tensile Strength	125	150	175	3000 by 1500	ASTM D6818 <sup>2</sup>
lbs/ft					
UV stability (minimum %	80	80	80	90	ASTM D4355 <sup>3</sup>
tensile retention)					(1000-hr exposure)
Minimum thickness (inches)	0.25	0.25	0.25	0.40	ASTM D6525
Slopes applications	2H:1V	1.5H:1V	1H:1V or	1 H: 1V or	
	or flatter	or flatter	flatter	greater	
Shear stress lbs/ft <sup>2</sup>	$6.0^{4}$	$8.0^{4}$	$10.0^{4}$	$12.0^4$	ASTM D6459
Channel applications					ASTM D6460-07

<sup>&</sup>lt;sup>1</sup> For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting alone.

#### 2.3 Quality Assurance Sampling, Testing, and Acceptance

- A) Provide TRM listed on the Department's List of Approved Materials. Prior to inclusion on the LAM, the manufacturer of TRM must meet the physical and performance criteria as outlined in the specification and submit a Letter Certifying compliance of the product under the above ASTM testing procedures and including a copy of report from Full Scale Independent Hydraulics Facility that Fully Vegetated Shear Stress meets shear stress requirements tested under D6459 and D6460-07.
- B) Contractors will provide a Letter of Certification from Manufacturer stating the product name, manufacturer, and that the product MARV product unit testing results meets Department criteria. Provide Letters once per project and for each product.
- C) Acceptance shall be in accordance with ASTM D-4759 based on testing performed by a Geosynthetic Accreditation Institute Laboratory Accreditation Program (GAI-LAP) accredited laboratory using Procedure A of ASTM D-4354.

<sup>&</sup>lt;sup>2</sup>Minimum Average Roll Values for tensile strength of sample material machine direction.

<sup>&</sup>lt;sup>3</sup>Tensile Strength percentage retained after stated 1000 hr duration of exposure under ASTM D4355 testing. Based on nondegradable components exclusively.

<sup>&</sup>lt;sup>4</sup>Maximum permissible shear design values based on short-term (0.5 hr) vegetated data obtained by full scale flume testing ASTM D6459, D6460-07. Based on nondegradable components exclusively. Testing will be done at Independent Hydraulics Facility such as Colorado State University hydraulics laboratory, Utah State University hydraulics laboratory, Texas Transportation Institute (TTI) hydraulics and erosion control laboratory.

Current mats meeting the above criteria are shown on the Department's List of Approved Materials.

- **2.4 Fasteners.** When the mat manufacturer does not specify a specific fastener, use steel wire U-shaped staples with a minimum diameter of 0.09 inches (11 gauge), a minimum width of one inch and a minimum length of 12 inches. Use a heavier gauge when working in rocky or clay soils and longer lengths in sandy soils as directed by Engineer or Manufacturer's Representative. Provide staples with colored tops when requested by the Engineer.
- **3.0 CONSTRUCTION.** 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. When there is a conflict between the Department's criteria and the Manufacturer's criteria, construct using the more restrictive. The Engineer and Manufacturer's Representative must approve all alternate installation methods prior to execution. Construct according to the Manufacturer's recommendations and the following as minimum installation technique:
- **3.1 Site Preparation.** Grade areas to be treated with matting and compact. Remove large rocks, soil clods, vegetation, roots, and other sharp objects that could keep the mat from intimate contact with subgrade. Prepare seedbed by loosening the top 2 to 3 inch of soil.
- **3.2 Installation.** Install mats according to Standard Drawing Sepias "Turf Mat Channel Installation" and "Turf Mat Slope Installation." Install mats at the specified elevation and alignment. Anchor the mats with staples with a minimum length of 12 inches. Use longer anchors for installations in sandy, loose, or wet soils as directed by the Engineer or Manufacturer's Representative. The mat should be in direct contact with the soil surface.
- **4.0 MEASUREMENT.** The Department will measure the quantity of Turf Reinforcement Mat by the square yard of surface covered. The Department will not measure preparation of the bed, providing a Manufacturer's Representative, topsoil, or seeding for payment and will consider them incidental to the Turf Reinforcement Mat. The Department will not measure any reworking of slopes or channels for payment as it is considered corrective work and incidental to the Turf Reinforcement Mat. Seeding and protection will be an incidental item.
- **5.0 PAYMENT.** The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
23274EN11F	Turf Reinforcement Mat 1	Square Yard
23275EN11F	Turf Reinforcement Mat 2	Square Yard
23276EN11F	Turf Reinforcement Mat 3	Square Yard
23277EN11F	Turf Reinforcement Mat 4	Square Yard

#### SPECIAL PROVISION FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

This Special Provision 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.** Construct a soil, granular, or rock embankment with granular or cohesive pile core and place structure granular backfill, as the Plans require. Construct the embankment according to the requirements of this Special Provision, the Plans, Standard Drawing RGX 100 and 105, and the 2012 Standard Specifications.

#### 2.0 MATERIALS.

- **2.1 Granular Embankment.** Conform to Subsection 805.10. When Granular Embankment materials are erodible or unstable according to Subsection 805.03.04, use the Special Construction Methods found in 3.2 of the Special Provision.
- **2.2 Rock Embankment.** Provide durable rock from roadway excavation that consists principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.
- **2.3 Granular Pile Core.** Select a gradation of durable rock to facilitate pile driving that conforms to Subsection 805.11. If granular pile core material hinders pile driving operations, take appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.
- **2.4** Cohesive Pile Core. Conform to Section 206 of the Standard Specifications and use soil with at least 50 percent passing a No. 4 sieve having a minimum Plasticity Index (PI) of 10. In addition, keep the cohesive pile core free of boulders, larger than 6 inches in any dimension, or any other obstructions, which would interfere with drilling operations. If cohesive pile core material interferes with drilling operations, take appropriate means necessary to maintain excavation stability, at no expense to the Department.
  - 2.5 Structure Granular Backfill. Conform to Subsection 805.11
- **2.6 Geotextile Fabric.** Conform to Type I or Type IV in Section 214 and 843 as required in the plans.

#### 3.0 CONSTRUCTION.

**3.1 General.** Construct roadway embankments at end bents according to Section 206 and in accordance with the Special Provision, the Plans, and Standard Drawings for the full embankment section. In some instances, granular or rock embankment will be required for embankment construction for stability purposes, but this special provision does not prevent the use of soil when appropriate. Refer to the plans for specific details regarding material requirements for embankment construction.

Place and compact granular or cohesive pile core, soil, granular or rock embankment, and structure granular backfill according to the applicable density requirements for the project. When constructing granular or rock embankments, use granular pile core for driven pile foundations and use cohesive pile core for pre-drilled pile or drilled shaft foundations. Place geotextile fabric, Type IV between cohesive pile core and structure

granular backfill and granular or rock embankment.

When granular or rock embankment is required for embankment construction, conform to the general requirements of Subsection 206.03.02 B). In addition, place the material in no greater than 2-foot lifts and compact with a vibrating smooth wheel roller capable of producing a minimum centrifugal force of 15 tons. Apply these requirements to the full width of the embankment for a distance of half the embankment height or 50 feet, whichever is greater, as shown on Standard Drawing RGX-105.

When using granular pile core, install 8-inch perforated underdrain pipe at or near the elevation of the original ground in the approximate locations depicted on the standard drawing, and as the Engineer directs, to ensure positive drainage of the embankment. Wrap the perforated pipe with a fabric of a type recommended by the pipe manufacturer.

After constructing the embankment, excavate for the end bent cap, drive piling or install shafts, place the mortar bed, construct the end bent, and complete the embankment to finish grade according to the construction sequence shown on the Plans or Standard Drawings and as specified hereinafter.

Certain projects may require widening of existing embankments and the removal of substructures. Construct embankment according to the plans. Substructure removal shall be completed according to the plans and Section 203. Excavation may be required at the existing embankment in order to place the structure granular backfill as shown in the Standard Drawings.

After piles are driven or shafts installed (see design drawings), slope the bottom of the excavation towards the ends of the trench as noted on the plans for drainage. Using a separate pour, place concrete mortar, or any class concrete, to provide a base for forming and placing the cap. Place side forms for the end bent after the mortar has set sufficiently to support workmen and forms without being disturbed.

Install 4-inch perforated pipe in accordance with the plans and Standard Drawings. In the event slope protection extends above the elevation of the perforated pipe, extend the pipe through the slope protection.

After placing the end bent cap and removing adjacent forms, fill the excavation with structure granular backfill material to the level of the berm prior to placing beams for the bridge. For soil embankments, place Type IV geotextile fabric between embankment material and structure granular backfill. After completing the end bent backwall, or after completing the span end wall, place the structure granular backfill to subgrade elevation. If the original excavation is enlarged, fill the entire volume with compacted structure granular backfill at no expense to the Department. Do not place backfill before removing adjacent form work. Place structure granular backfill material in trench ditches at the ends of the excavation. Place Geotextile Fabric, Type IV over the surface of structure granular backfill prior to placing aggregate base course.

Tamp the backfill with hand tampers, pneumatic tampers, or other means the Engineer approves. Thoroughly compact the backfill under the overhanging portions of the structure to ensure that the backfill is in intimate contact with the sides of the structure.

Do not apply seeding, sodding, or other vegetation to the exposed granular embankment.

**3.2 Special Construction Methods.** Erodible or unstable materials may erode even when protected by riprap or channel lining; use the special construction method described below when using these materials.

Use fine aggregates or friable sandstone granular embankment at "dry land" structures only. Do not use them at stream crossings or locations subject to flood waters. For erodible or unstable materials having 50 percent or more passing the No. 4 sieve, protect with geotextile fabric. Extend the fabric from the original ground to the top of slope over the entire area of the embankment slopes on each side of, and in front of, the

end bent. Cover the fabric with at least 12 inches of non-erodible material.

For erodible or unstable materials having less than 50 percent passing a No. 4 sieve, cover with at least 12 inches of non-erodible material.

Where erodible or unstable granular embankment will be protected by riprap or channel lining, place geotextile fabric between the embankment and the specified slope protection.

#### 4.0 MEASUREMENT.

**4.1 Granular Embankment**. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment any Granular Embankment that is not called for in the plans.

The Department will not measure for payment any special construction caused by using erodible or unstable materials and will consider it incidental to the Granular Embankment regardless of whether the erodible or unstable material was specified or permitted.

- **4.2 Rock Embankment.** The Department will not measure for payment any rock embankment and will consider it incidental to roadway excavation or embankment in place, as applicable. Rock embankments will be constructed using granular embankment on projects where there is no available rock present within the excavation limits of the project.
- **4.3 Granular Pile Core.** The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment furnishing and placing 8-inch perforated underdrain pipe and will consider it incidental to the Granular pile core. The Department will not measure for payment any granular pile core that is necessary because the contractor elects to use granular or rock embankment when it is not specified in the plans.
- **4.4 Cohesive Pile Core**. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204.
- **4.5 Structure Granular Backfill.** The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure any additional material required for backfill outside the limits shown on the Plans and Standard Drawings for payment and will consider it incidental to the work.

The Department will not measure structure excavation at the end bent or an existing embankment for payment and will consider it incidental to Structure Granular Backfill.

The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Structure Granular Backfill.

- **4.6 Geotextile Fabric.** The Department will measure the quantities as specified in Section 214. The Department will not measure the quantity of fabric used for separating granular or rock embankment and cohesive pile core and will consider it incidental to cohesive pile core.
  - **4.7 End Bent.** The Department will measure the quantities according to the

Contract. The Department will not measure furnishing and placing the 2-inch mortar or concrete bed for payment and will consider it incidental to the end bent construction.

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

Code	Pay Item	Pay Unit
02223	Granular Embankment	Cubic Yards
20209EP69	Granular Pile Core	Cubic Yards
20210EP69	Cohesive Pile Core	Cubic Yards
02231	Structure Granular Backfill	Cubic Yards
02596, 02599	Geotextile Fabric, Type	See Section 214

The Department will consider payment as full compensation for all work required in this provision.

June 15, 2012

### **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 administrating 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 workweek 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: <a href="https://www.eProcurement.ky.gov">https://www.eProcurement.ky.gov</a>.

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

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

General Decision Number: KY160100 03/25/2016 KY100

Superseded General Decision Number: KY20150100

State: Kentucky

Construction Type: Highway

Counties: Anderson, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Carroll, Carter, Clark, Elliott, Fayette, Fleming, Franklin, Gallatin, Grant, Grayson, Greenup, Hardin, Harrison, Henry, Jefferson, Jessamine, Larue, Lewis, Madison, Marion, Mason, Meade, Mercer, Montgomery, Nelson, Nicholas, Oldham, Owen, Robertson, Rowan, Scott, Shelby, Spencer, Trimble, Washington and Woodford 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: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.15 for calendar year 2016 applies to all contracts subject to the Davis-Bacon Act for which the solicitation was 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 \$10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. 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.

Modification Number Publication Date 0 01/08/2016 1 02/19/2016 2 03/25/2016

BRIN0004-003 06/01/2011

BRECKENRIDGE COUNTY

Rates Fringes

BRICKLAYER.....\$ 24.11 10.07

BRKY0001-005 06/01/2015

BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, & TRIMBLE COUNTIES:

Rates Fringes

BRICKLAYER	\$ 25.96	10.64
BRKY0002-006 06/01/2011		
BRACKEN, GALLATIN, GRANT, M	ASON & ROBERTSON (	COUNTIES:
	Rates	Fringes
BRICKLAYER	\$ 26.57	10.26
BRKY0007-004 06/01/2015		
BOYD, CARTER, ELLIOT, FLEMIN	NG, GREENUP, LEWIS	S & ROWAN COUNTIES:
	Rates	Fringes
BRICKLAYER	\$ 31.38	18.10
BRKY0017-004 06/01/2015		
ANDERSON, BATH, BOURBON, BO'HARRISON, JESSAMINE, MADISONOWEN, SCOTT, WASHINGTON & WO	N, MERCER, MONTGON	
	Rates	Fringes
BRICKLAYER	\$ 24.79	11.72
CARP0064-001 05/01/2015		
	Rates	Fringes
CARPENTER  Diver PILEDRIVERMAN	\$ 41.63	16.06 16.06 16.06
ELEC0212-008 06/01/2015		
BRACKEN, GALLATIN and GRANT	COUNTIES	
	Rates	Fringes
ELECTRICIAN		17.02
ELEC0212-014 12/01/2014		
BRACKEN, GALLATIN & GRANT CO	OUNTIES:	
	Rates	Fringes
Sound & Communication Technician	\$ 22.75	10.08
ELEC0317-012 05/28/2014		
BOYD, CARTER, ELLIOT & ROWA	N COUNTIES:	
	Rates	Fringes

ELECTRICIAN	
ETECTIVECTAIN	

Cable Splicer	\$ 32.68	18.13
Electrician	\$ 32.62	21.45

ELEC0369-007 05/27/2015

ANDERSON, BATH, BOURBON, BOYLE, BRECKINRIDGE, BULLITT, CARROLL, CLARK, FAYETTE, FRAONKLIN, GRAYSON, HARDIN, HARRISON, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, MONTGOMERY, NELSON, NICHOLAS, OLDHAM, OWEN, ROBERTSON, SCOTT, SHELBY, SPENCER, TRIMBLE, WASHINGTON, & WOODFORD COUNTIES:

	Rates	Fringes
ELECTRICIAN		15.65
ELEC0575-002 06/02/2014		
FLEMING, GREENUP, LEWIS & MASON	COUNTIES:	
	Rates	Fringes
ELECTRICIAN	.\$ 31.70	14.21
ENGI0181-018 07/01/2015		
	Rates	Fringes
POWER EQUIPMENT OPERATOR GROUP 1	.\$ 29.95	14.40

14.40

14.40

14.40

### OPERATING ENGINEER CLASSIFICATIONS

GROUP 2.....\$ 27.26

GROUP 3.....\$ 27.68

GROUP 4....\$ 26.96

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller; Batcher Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-All Scoop; Carry Deck Crane; Central Compressor Plant; Cherry Picker; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Overhead Crane; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Rough Terrain Crane; Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment

GROUP 2 - Air Compressor (Over 900 cu. ft. per min.);
Bituminous Mixer; Boom Type Tamping Machine; Bull Float;
Concrete Mixer (Under 21 cu. ft.); Dredge Engineer;
Electric Vibrator; Compactor/Self-Propelled Compactor;
Elevator (One Drum or Buck Hoist); Elevator (When used to
Hoist Building Material); Finish Machine; Firemen & Hoist
(One Drum); Flexplane; Forklift (Regardless of Lift
Height); Form Grader; Joint Sealing Machine; Outboard Motor
Boat; Power Sweeper (Riding Type); Roller (Rock); Ross
Carrier; Skid Mounted or Trailer Mounted Conrete Pump; Skid
Steer Machine with all Attachments; Switchman or Brakeman;
Throttle Valve Person; Tractair & Road Widening Trencher;
Tractor (50 H.P. or Over); Truck Crane Oiler; Tugger;
Welding Machine; Well Points; & Whirley Oiler

GROUP 3 - All Off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment

GROUP 4 - Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steerman; Tamping Machine; Tractor (Under 50 H.P.); & Vibrator

CRANES - with booms 150 ft. & Over (Including JIB), and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - \$1.00 over Group 1 rate

EMPLOYEES ASSIGNED TO WORK BELOW GROUND LEVEL ARE TO BE PAID 10%

ABOVE BASIC WAGE RATE. THIS DOES NOT APPLY TO OPEN CUT WORK.

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### IRON0044-009 06/01/2015

BRACKEN, GALLATIN, GRANT, HARRISON, ROBERTSON, BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan); CARROLL (Eastern third, including the Township of Ghent); FLEMING (Western part, excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford); MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington); NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills); OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley); SCOTT (Northern two-thirds, including Townships of Biddle,

Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall)

	Rates	Fringes
IRONWORKER		
Fence Erector	\$ 23.76	19.15
Structural	\$ 26.40	19.15

IRON0070-006 06/01/2015

ANDERSON, BOYLE, BRECKINRIDGE, BULLITT, FAYETTE, FRANKLIN, GRAYSON, HARDIN, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE, WASHINGTON & WOODFORD
BOURBON (Southern two-thirds, including Townships of Austerlity, Centerville, Clintonville, Elizabeth, Hutchison, Littlerock, North Middletown & Paris);
CARROLL (Western two-thirds, including Townships of Carrollton, Easterday, English, Locust, Louis, Prestonville & Worthville);
CLARK (Western two-thirds, including Townships of Becknerville, Flanagan, Ford, Pine Grove, Winchester & Wyandotte);
OWEN (Eastern eighth, including Townships of Glenmary, Gratz, Monterey, Perry Park & Tacketts Mill);
SCOTT (Southern third, including Townships of Georgetown, Great Crossing, Newtown, Stampling Ground & Woodlake);

	Rates	Fringes
IRONWORKER	\$ 27.56	20.30

IRON0372-006 06/15/2015

BRACKEN, GALLATIN, GRANT, HARRISON and ROBERTSON BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan); CARROLL (Eastern third, including the Township of Ghent); FLEMING (Western part, Excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford); MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington); NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills); OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook,

OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);

SCOTT (Northern two-thirds, including Townships of Biddle, Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall) COUNTIES

	Rates	Fringes
IRONWORKER, REINFORCING	\$ 27.00	19.00
IRON0769-007 06/01/2015		

BATH, BOYD, CARTER, ELLIOTT, GREENUP, LEWIS, MONTGOMERY & ROWAN CLARK (Eastern third, including townships of Bloomingdale, Hunt, Indian Fields, Kiddville, Loglick, Rightangele & Thomson); FLEMING (Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford); MASON (Eastern third, including Townships of Helena, Marshall, Orangeburg, Plumville & Springdale); NICHOLAS (Eastern eighth, including the Township of Moorefield Sprout)

	Rates	Fringes
IRONWORKER		
ZONE 1	\$ 31.33	22.39
ZONE 2	\$ 31.73	22.39
ZONE 3	\$ 33.33	22.39

ZONE 1 - Up to 10 mile radius of Union Hall, Ashland, Ky., 1643 Greenup Ave.

ZONE 2 - 10 to 50 mile radius of Union Hall, Ashland, Ky., 1643 Greenup Ave.

ZONE 3 - 50 mile radius & over of Union Hall, Ashland, Ky., 1643 Greenup Ave.

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#### LABO0189-003 07/01/2015

BATH, BOURBON, BOYD, BOYLE, BRACKEN, CARTER, CLARK, ELLIOTT, FAYETTE, FLEMING, FRANKLIN, GALLATIN, GRANT, GREENUP, HARRISON, JESSAMINE, LEWIS, MADISON, MASON, MERCER, MONTGOMERY, NICHOLAS, OWEN, ROBERTSON, ROWAN, SCOTT, & WOOLFORD COUNTIES

	I	Rates	Fringes
Laborers:			
GROUP	1\$	22.30	12.46
GROUP	2\$	22.55	12.46
GROUP	3\$	22.60	12.46
GROUP	4\$	23.20	12.46

### 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; Bushammer; 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 Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

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LABO0189-008 07/01/2014

ANDERSON, BULLITT, CARROLL, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

		Rates	Fringes
Laborers:			
GROUP	1\$	22.71	11.05
GROUP	2\$	22.96	11.05
GROUP	3\$	23.01	11.05
GROUP	4\$	23.61	11.05

#### 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; Bushammer; 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 Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

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LABO0189-009 07/01/2014

BRECKINRIDGE & GRAYSON COUNTIES

	I	Rates	Fringes
Laborers:			
GROUP	1\$	22.66	11.10
GROUP	2\$	22.91	11.10
GROUP	3\$	22.96	11.10
GROUP	4\$	23.56	11.10

### 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; Bushammer; 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 Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

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PAIN0012-005 06/11/2005

BATH, BOURBON, BOYLE, CLARK, FAYETTE, FLEMING, FRANKLIN, HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS, ROBERTSON, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes
PAINTER		
Bridge/Equipment Tender		
and/or Containment Builder	\$ 18.90	5.90
Brush & Roller	\$ 21.30	5.90
Elevated Tanks;		
Steeplejack Work; Bridge &		
Lead Abatement	\$ 22.30	5.90
Sandblasting &		
Waterblasting	\$ 22.05	5.90
Spray	\$ 21.80	5.90

PAIN0012-017 05/01/2015

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

F	Rates	Fringes
PAINTER (Heavy & Highway		
Bridges - Guardrails -		
Lightpoles - Striping)		
Bridge Equipment Tender		
and Containment Builder\$	20.73	9.06
Brush & Roller\$	23.39	9.06
Elevated Tanks;		
Steeplejack Work; Bridge &		
Lead Abatement\$	24.39	9.06
Sandblasting & Water		

Blasting	\$ 24.14	9.06
Spray	\$ 23.89	9.06

PAIN0118-004 06/01/2014

ANDERSON, BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:

	Rates	Fringes
PAINTER		
Brush & Roller	\$ 18.50	11.97
Spray, Sandblast, Power		
Tools, Waterblast & Steam		
Cleaning	\$ 19.50	11.97

PAIN1072-003 12/01/2015

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS and ROWAN COUNTIES

	Rates	Fringes	
Painters:		14.27	
Tension Towers & Energized Substations Power Generating Facilities	\$ 31.83	15.30 15.30	

PLUM0248-003 06/01/2015

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes	
Plumber and Steamfitter	\$ 34.00	19.04	

PLUM0392-007 06/01/2014

BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN & ROBERTSON COUNTIES:

	Rates	Fringes
Plumbers and Pipefitters	\$ 29.80	17.79

<sup>\*</sup> PLUM0502-003 08/01/2015

BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN (Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

	Rates	Fringes
PLUMBER	\$ 32.00	19.13

SUKY2010-160 10/08/2001

	Rates	Fringes
Truck drivers:		
GROUP 1	\$ 16.57	7.34
GROUP 2	\$ 16.68	7.34
GROUP 3	\$ 16.86	7.34
GROUP 4	\$ 16.96	7.34

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Mobile Batch Truck Tender

GROUP 2 - Greaser; Tire Changer; & Mechanic Tender

GROUP 3 - Single Axle Dump; Flatbed; Semi-trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Distributor; Mixer; & Truck Mechanic

GROUP 4 - Euclid & Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat; 5-Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker

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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  $(29CFR \ 5.5 \ (a) \ (1) \ (ii))$ .

\_\_\_\_\_

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-III- 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**

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## **PROPOSAL BID ITEMS**

Report Date 5/2/16

Section: 0001 - PAVING

LINE	BID CODE	ALT DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
0010	00003	CRUSHED STONE BASE	24,578.00	TON		\$	
0020	00020	TRAFFIC BOUND BASE	230.00	TON		\$	
0030	00100	ASPHALT SEAL AGGREGATE	125.00	TON		\$	
0040	00103	ASPHALT SEAL COAT	15.00	TON		\$	
0050	00190	<b>LEVELING &amp; WEDGING PG64-22</b>	16,842.00	TON		\$	
0060	00214	CL3 ASPH BASE 1.00D PG64-22	36,540.00	TON		\$	
0070	00324	CL3 ASPH SURF 0.50B PG64-22	9,100.00	TON		\$	
0800	02070	JPC PAVEMENT-12 IN	1,119.00	SQYD		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
0110	00078		CRUSHED AGGREGATE SIZE NO 2	2,850.00	TON		\$	
0120	01810		STANDARD CURB AND GUTTER	51.00	LF		\$	
0130	01820		LIP CURB AND GUTTER	3,459.00	LF		\$	
0140	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	42.00	EACH		\$	
0150	02014		BARRICADE-TYPE III	12.00	EACH		\$	
0160	02091		REMOVE PAVEMENT	6,361.00	SQYD		\$	
0170	02159		TEMP DITCH	1,000.00	LF		\$	
0180	02160		CLEAN TEMP DITCH	500.00	LF		\$	
0190	02230		EMBANKMENT IN PLACE	86,561.00	CUYD		\$	
0200	02242		WATER	150.00	MGAL		\$	
0210	02351		GUARDRAIL-STEEL W BEAM-S FACE	2,062.50	LF		\$	
0220	02360		<b>GUARDRAIL TERMINAL SECTION NO 1</b>	1.00	EACH		\$	
0230	02363		GUARDRAIL CONNECTOR TO BRIDGE END TY A	4.00	EACH		\$	
0240	02373		GUARDRAIL END TREATMENT TYPE 3	1.00	EACH		\$	
0250	02381		REMOVE GUARDRAIL	1,993.00	LF		\$	
0260	02391		GUARDRAIL END TREATMENT TYPE 4A	4.00	EACH		\$	
0270	02429		RIGHT-OF-WAY MONUMENT TYPE 1	39.00	EACH		\$	
0280	02432		WITNESS POST	39.00	EACH		\$	
0290	02484		CHANNEL LINING CLASS III	662.20	TON		\$	
0300	02545		CLEARING AND GRUBBING (APPROXIMATELY 37.4 ACRES)	1.00	LS		\$	
0310	02562		TEMPORARY SIGNS	500.00	SQFT		\$	
0320	02565		OBJECT MARKER TYPE 2	2.00	EACH		\$	
0330	02585		EDGE KEY	13.00	LF		\$	
0340	02599		FABRIC-GEOTEXTILE TYPE IV	21,240.00	SQYD		\$	
0350	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	27,300.00	SQYD	\$2.00	\$	\$54,600.00
0360	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0370	02671		PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH		\$	
0380	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
0390	02677		ASPHALT PAVE MILLING & TEXTURING	177.00	TON		\$	
0400	02690		SAFELOADING	14.00	CUYD		\$	
0410	02696		SHOULDER RUMBLE STRIPS-SAWED	28,300.00	LF		\$	
0420	02701		TEMP SILT FENCE	7,275.00	LF		\$	

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\$

\$

2,631.00 SQYD

855.00 EACH

161234

### **PROPOSAL BID ITEMS**

### Report Date 5/2/16

**QUANTITY** LINE BID CODE **ALT DESCRIPTION** UNIT UNIT PRIC FP AMOUNT 0430 02703 SILT TRAP TYPE A 5.00 EACH \$ 0440 02704 SILT TRAP TYPE B 60.00 EACH \$ 0450 02705 SILT TRAP TYPE C 75.00 EACH \$ 0460 02706 **CLEAN SILT TRAP TYPE A** 5.00 EACH \$ 0470 \$ 02707 **CLEAN SILT TRAP TYPE B** 60.00 EACH \$ 0480 02708 **CLEAN SILT TRAP TYPE C** 75.00 EACH 0490 1.00 LS \$ 02726 STAKING LS \$ 0500 02731 REMOVE STRUCTURE 1.00 0510 02775 **ARROW PANEL** 2.00 EACH \$ \$ 0520 **CONCRETE BARRIER WALL TYPE 9T** LF 03171 480.00 \$ 0530 03262 **CLEAN PIPE STRUCTURE** 6.00 EACH \$ 0540 05950 **EROSION CONTROL BLANKET** 7,408.00 SQYD **TEMP MULCH** 0550 42.709.00 SQYD \$ 05952 0560 05953 TEMP SEEDING AND PROTECTION 32.064.00 SQYD \$ \$ 0570 05963 **INITIAL FERTILIZER** 2.00 TON 0580 **20-10-10 FERTILIZER** TON \$ 05964 3.30 \$ 0590 05985 SEEDING AND PROTECTION 64,127.00 SQYD SPECIAL SEEDING CROWN VETCH 4,067.00 SQYD \$ 0600 05989 AGRICULTURAL LIMESTONE \$ 0610 05992 40.00 TON 0620 06510 **PAVE STRIPING-TEMP PAINT-4 IN** 128,444.00 LF \$ **PAVE STRIPING-PERM PAINT-4 IN** 0630 06514 (QTY IS A SUM OF WHITE & YELLOW) 73,777.00 LF \$ 0640 PAVE STRIPING-TEMP REM TAPE-W LF \$ 06550 3.032.00 **PAVE STRIPING-TEMP REM TAPE-Y** \$ 0650 06551 3.079.00 LF 0660 06574 PAVE MARKING-THERMO CURV ARROW 84.00 EACH \$ PAVE MARKING-THERMO MERGE ARROW \$ 0670 06578 2.00 EACH 0680 08903 **CRASH CUSHION TY VI CLASS BT TL3** 2.00 EACH \$1.00 \$ 0690 10020NS **FUEL ADJUSTMENT** 104,729.00 DOLL \$104,729.00 0700 \$149,090.00 10030NS ASPHALT ADJUSTMENT 149.090.00 DOLL \$1.00 \$ 0710 20209EP69 **GRANULAR PILE CORE** 180.00 CUYD \$ \$ 0720 20757ED **PAVEMENT REPAIR** 670.00 SQYD 0730 22664EN WATER BLASTING EXISTING STRIPE 56,497.00 LF \$

### Section: 0003 - DRAINAGE

23274EN11F

24489EC

0740

0750

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
0760	00440		ENTRANCE PIPE-15 IN	252.00	LF		\$	
0770	00441		ENTRANCE PIPE-18 IN	150.00	LF		\$	
0780	00462		CULVERT PIPE-18 IN	645.00	LF		\$	
0790	00464		CULVERT PIPE-24 IN	86.00	LF		\$	
0800	00521		STORM SEWER PIPE-15 IN	148.00	LF		\$	
0810	00522		STORM SEWER PIPE-18 IN	566.00	LF		\$	
0820	00524		STORM SEWER PIPE-24 IN	695.00	LF		\$	
0830	00526		STORM SEWER PIPE-30 IN	944.00	LF		\$	
0840	00528		STORM SEWER PIPE-36 IN	459.00	LF		\$	
0850	00529		STORM SEWER PIPE-42 IN	830.00	LF		\$	
0860	00530		STORM SEWER PIPE-48 IN	577.00	LF		\$	

**TURF REINFORCEMENT MAT 1** 

INLAID PAVEMENT MARKER

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PROPOSAL BID ITEMS

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### Report Date 5/2/16

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
0870	01000		PERFORATED PIPE-4 IN	77.00	LF		\$	
0880	01010		NON-PERFORATED PIPE-4 IN	30.00	LF		\$	
0890	01032		PERF PIPE HEADWALL TY 4-4 IN	2.00	EACH		\$	
0900	01204		PIPE CULVERT HEADWALL-18 IN	7.00	EACH		\$	
0910	01216		PIPE CULVERT HEADWALL-48 IN	1.00	EACH		\$	
0920	01450		S & F BOX INLET-OUTLET-18 IN	18.00	EACH		\$	
0930	01451		S & F BOX INLET-OUTLET-24 IN	2.00	EACH		\$	
0940	01480		CURB BOX INLET TYPE B	26.00	EACH		\$	
0950	01490		DROP BOX INLET TYPE 1	1.00	EACH		\$	
0960	01545		DROP BOX INLET TYPE 11 MOD	1.00	EACH		\$	
0970	01650		JUNCTION BOX	9.00	EACH		\$	
0980	01720		RECONSTRUCT INLET	1.00	EACH		\$	
0990	01767		MANHOLE TYPE C	2.00	EACH		\$	
1000	08100		CONCRETE-CLASS A	1.07	CUYD		\$	
1010	23952EC		DRAINAGE JUNCTION BOX TY B	1.00	EACH		\$	

## Section: 0004 - BRIDGE - NAS HAUL ROAD - DWG. 27336

LINE	BID CODE	ALT DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
1020	00003	CRUSHED STONE BASE	53.00	TON		\$	
1030	00100	ASPHALT SEAL AGGREGATE	21.00	TON		\$	
1040	00103	ASPHALT SEAL COAT	3.00	TON		\$	
1050	00214	CL3 ASPH BASE 1.00D PG64-22	95.00	TON		\$	
1060	00312	CL3 ASPH SURF 0.50D PG64-22	45.00	TON		\$	
1070	00462	CULVERT PIPE-18 IN	222.00	LF		\$	
1080	01480	CURB BOX INLET TYPE B	2.00	EACH		\$	
1090	01544	DROP BOX INLET TYPE 11	1.00	EACH		\$	
1100	01830	STANDARD INTEGRAL CURB	599.00	LF		\$	
1110	02203	STRUCTURE EXCAV-UNCLASSIFIED	14.00	CUYD		\$	
1120	02355	<b>GUARDRAIL-STEEL W BEAM-S FACE A</b>	775.00	LF		\$	
1130	02360	<b>GUARDRAIL TERMINAL SECTION NO 1</b>	3.00	EACH		\$	
1140	02363	GUARDRAIL CONNECTOR TO BRIDGE END TY A	3.00	EACH		\$	
1150	02585	EDGE KEY	20.00	LF		\$	
1160	02611	HANDRAIL-TYPE A-1	38.00	LF		\$	
1170	02720	SIDEWALK-4 IN CONCRETE	349.00	SQYD		\$	
1180	02998	MASONRY COATING	2,167.40	SQYD		\$	
1190	03299	ARMORED EDGE FOR CONCRETE	66.00	LF		\$	
1200	05997	TOPSOIL FURNISHED AND PLACED	691.00	CUYD		\$	
1210	08001	STRUCTURE EXCAVATION-COMMON	1,219.00	CUYD		\$	
1220	08018	RETAINING WALL	1,643.00	SQFT		\$	
1230	08018	RETAINING WALL (GRAVITY RETAINING WALL - SEE PLANS)	152.00	SQFT		\$	
1240	08019	CYCLOPEAN STONE RIP RAP	2,320.00	TON		\$	
1250	08033	TEST PILES	164.00	LF		\$	
1260	08100	CONCRETE-CLASS A	971.10	CUYD		\$	
1270	08104	CONCRETE-CLASS AA	269.00	CUYD		\$	
1280	08141	MECHANICAL REINF COUPLER #6 EPOXY COATED	474.00	EACH		\$	
1290	08150	STEEL REINFORCEMENT	123,743.00	LB		\$	

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## **PROPOSAL BID ITEMS**

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Report Da	ate 5/2	1/16
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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
1300	23233EC		DYNAMIC PILE TESTING	4.00	EACH		\$	
1310	23546EC		PIPE PILE-18 IN	3,820.30	LF		\$	
1320	23964EC		PROTECTIVE FENCE	189.00	LF		\$	
1330	24042EC		INSIDE FIT SNUB NOSE CONICAL POINT-18 IN	55.00	EACH		\$	
1340	24112EC		STEEL REINFORCEMENT STAINLESS STEEL	57,087.00	LB		\$	
1350	24451EC		CONCRETE (CL AA, CL A & PRESTRESSED GIRDER, SEE PLAN NOTE)	1,390.00	CUYD		\$	
1360	24463ED		PPC I-BEAM HN 54 49	547.50	LF		\$	
1370	24596EN		GRANULAR BACKFILL	6,332.00	CUYD		\$	
1380	24701ED		CORED HOLE IN DRAINAGE PIPE	1.00	EACH		\$	
1390	40023		KYTC S&F HEADWALL-18 IN	2.00	EACH		\$	

## Section: 0005 - BRIDGE - MCCOOL'S CREEK - DWG. 27171

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
1400	02231		STRUCTURE GRANULAR BACKFILL	194.00	CUYD		\$	
1410	02998		MASONRY COATING	517.00	SQYD		\$	
1420	03299		ARMORED EDGE FOR CONCRETE	112.00	LF		\$	
1430	08001		STRUCTURE EXCAVATION-COMMON	1,088.00	CUYD		\$	
1440	08019		CYCLOPEAN STONE RIP RAP	3,786.00	TON		\$	
1450	08033		TEST PILES	244.00	LF		\$	
1460	08100		CONCRETE-CLASS A	292.00	CUYD		\$	
1470	08104		CONCRETE-CLASS AA	431.40	CUYD		\$	
1480	08130		MECHANICAL REINF COUPLER #5	28.00	EACH		\$	
1490	08133		MECHANICAL REINF COUPLER #8	16.00	EACH		\$	
1500	08134		MECHANICAL REINF COUPLER #9	12.00	EACH		\$	
1510	08135		MECHANICAL REINF COUPLER #10	12.00	EACH		\$	
1520	08140		MECHANICAL REINF COUPLER #5 EPOXY COATED	989.00	EACH		\$	
1530	08150		STEEL REINFORCEMENT	43,380.00	LB		\$	
1540	08151		STEEL REINFORCEMENT-EPOXY COATED	108,266.00	LB		\$	
1550	08633		PRECAST PC I BEAM TYPE 3	1,549.30	LF		\$	
1560	21532ED		RAIL SYSTEM TYPE III	450.00	LF		\$	
1570	23546EC		PIPE PILE-18 IN	2,670.00	LF		\$	
1580	24042EC		INSIDE FIT SNUB NOSE CONICAL POINT-18 IN	54.00	EACH		\$	

## Section: 0006 - UTILITY - GASLINE RELOCATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
1590	16000		G DIRECTIONAL BORE	300.00	LF		\$	
1600	16014		G MAIN POINT RELOCATE (6-IN GAS LOWERING W/ TEMP BYPASS)	2.00	EACH		\$	
1610	16025		G PIPE STEEL 04 INCH	124.00	LF		\$	
1620	16026		G PIPE STEEL 06 INCH	60.00	LF		\$	
1630	16028		G PIPE STEEL 10 INCH	10,511.00	LF		\$	
1640	16031		G SERVICE LONG SIDE 1 OR 1-1/4 INCH	1.00	EACH		\$	

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## **PROPOSAL BID ITEMS**

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### Report Date 5/2/16

			110   012/10					
LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
1650	16033		G SERVICE LONG SIDE 2 INCH	1.00	EACH		\$	
1660	16034		G SERVICE LONG SIDE 3/4 INCH	2.00	EACH		\$	
1670	16036		G SERVICE SHORT SIDE 1 OR 1-1/4 INCH	1.00	EACH		\$	
1680	16038		G SERVICE SHORT SIDE 2 INCH	2.00	EACH		\$	
1690	16039		G SERVICE SHORT SIDE 3/4 INCH	1.00	EACH		\$	
1700	16040		G SERVICE SPECIAL	3.00	EACH		\$	
1710	16043		G TIE-IN POLYETHYLENE/PLASTIC 04 INCH	1.00	EACH		\$	
1720	16044		G TIE-IN POLYETHYLENE/PLASTIC 06 INCH	3.00	EACH		\$	
1730	16056		G VALVE SPECIAL (ABOVE GRADE ISOLATION VALVE)	2.00	EACH		\$	
1740	16059		G VALVE STEEL 04 INCH	2.00	EACH		\$	
1750	16060		G VALVE STEEL 06 INCH	1.00	EACH		\$	
1760	16065		G LINE MARKER	36.00	EACH		\$	
1770	21341ND		BOLLARDS	8.00	EACH		\$	

Section: 0007 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
1780	15000		S BYPASS PUMPING	5.00	EACH		\$	
1790	15011		S DIRECTIONAL BORE (6-IN	650.00	LF		\$	
1800	15012		S ENCASEMENT CONCRETE	70.00	LF		\$	
1810	15015		S ENCASEMENT STEEL BORED RANGE 2 (8-IN)	95.00	LF		\$	
1820	15026		S FORCE MAIN AIR RLS/VAC VLV 02 IN (COMBINATION AIR VALVE)	4.00	EACH		\$	
1830	15057		S FORCE MAIN PVC 02 INCH (SDR 21)	150.00	LF		\$	
1840	15060		S FORCE MAIN PVC 06 INCH (HDPE, DR11)	11,113.00	LF		\$	
1850	15074		S FORCE MAIN TIE-IN 06 INCH	7.00	EACH		\$	
1860	15093		S MANHOLE ABANDON/REMOVE	2.00	EACH		\$	
1870	15119		S PUMP STATION	1.00	EACH		\$	
1880	15120		S SPECIAL ITEM (MANHOLE AT 3-IN FORCE MAIN TIE-IN AT 6- IN FORCE MAIN)	1.00	EACH		\$	
1890	15122		S STRUCTURE REMOVAL (PUMP STATION WET WELL AND VALVE VAULT)	2.00	EACH		\$	
1900	15123		S LINE MARKER	7.00	EACH		\$	

Section: 0008 - WATERLINE - US 42

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
1910	14000		W AIR RELEASE VALVE 1 INCH	4.00	EACH		\$	
1920	14019		W FIRE HYDRANT ASSEMBLY	4.00	EACH		\$	
1930	14060		W PIPE PVC 08 INCH (SDR 17)	6,267.00	LF		\$	
1940	14066		W PIPE PVC SPECIAL (RESTRAINED JOINT 8-IN PVC SDR 17)	760.00	LF		\$	

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## **PROPOSAL BID ITEMS**

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	AMOUNT
1950	14076		W REMOVE TRANSITE (AC) PIPE (NOT TO BE PAID AT TIE-IN LOCATIONS)	200.00	LF		\$	
1960	14077		W SERV PE/PLST LONG SIDE 1 IN	1.00	EACH		\$	
1970	14080		W SERV PE/PLST LONG SIDE 3/4 IN	2.00	EACH		\$	
1980	14082		W SERV PE/PLST SHORT SIDE 1 IN	2.00	EACH		\$	
1990	14084		W SERV PE/PLST SHORT SIDE 2 IN	3.00	EACH		\$	
2000	14085		W SERV PE/PLST SHORT SIDE 3/4 IN	1.00	EACH		\$	
2010	14094		W TIE-IN 06 INCH	4.00	EACH		\$	
2020	14101		W TIE-IN SPECIAL (TIE-IN TO 6-IN ASBESTOS CONCRETE PIPE)	2.00	EACH		\$	
2030	14103		W VALVE 03 INCH	1.00	EACH		\$	
2040	14105		W VALVE 06 INCH	1.00	EACH		\$	
2050	14106		W VALVE 08 INCH	7.00	EACH		\$	
2060	14126		W ENCASEMENT SPECIAL (12" PVC CASING PIPE-OPEN CUT AT UTILITY AND ENTRANCE CROSSINGS)	858.00	LF		\$	
2070	14131		W METER SPECIAL		EACH		\$	
2080	14144		W LINE MARKER		EACH		\$	

# Section: 0009 - WATERLINE - NAS HAUL ROAD

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	<b>UNIT PRIC</b>	FP	<b>AMOUNT</b>
2090	14037		W PIPE DUCTILE IRON 08 INCH	135.00	LF		\$	
2100	14074		W PLUG EXISTING MAIN	2.00	EACH		\$	
2110	14088		W STRUCTURE REMOVAL (REMOVE EXISTING POST INDICATOR VALVE)	1.00	EACH		\$	
2120	14089		W TAPPING SLEEVE AND VALVE SIZE 1	2.00	EACH		\$	
2130	14124		W VALVE SPECIAL (INSTALL NEW POST INDICATOR VALVE)	1.00	EACH		\$	
2140	14146		W SERV COPPER LONG SIDE 1-1/2 IN (RELOCATE EXISTING 1 1/2 IN WATER LINE)	1.00	EACH		\$	
2150	16026		G PIPE STEEL 06 INCH	450.00	LF		\$	
2160	16544		G TIE-IN POLYETHYLENE/PLASTIC 06 IN INST	2.00	EACH		\$	

# Section: 0010 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT DESCRIPTION	QUANTITY UNIT UNIT PRIC FF	AMOUNT
0090	02568	MOBILIZATION	1.00 LS \$	
0100	02569	DEMOBILIZATION	1.00 LS \$	