CALL NO. 304

CONTRACT ID. 121348

WARREN COUNTY

FED/STATE PROJECT NUMBER FD04 SPP 114 0884 009-010

DESCRIPTION THREE SPRINGS ROAD (KY 884)

WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE

PRIMARY COMPLETION DATE 120 WORKING DAYS

LETTING DATE: November 16,2012

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME November 16,2012. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

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

TABLE OF CONTENTS

PART I

SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 03

CONTRACT ID - 121348

FD04 SPP 114 0884 009-010

COUNTY - WARREN

PCN - DE11408841248

FD04 SPP 114 0884 009-010

THREE SPRINGS ROAD (KY 884) IMPROVE THREE SPRINGS ROAD TO REDUCE CONGESTION AT INTERSECTION WITH SCOTTSVILLE ROAD, A DISTANCE OF 0.31 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 03-00102.10.

GEOGRAPHIC COORDINATES LATITUDE 36:56:14.00 LONGITUDE 86:25:11.00

COMPLETION DATE(S):

120 WORKING DAYS

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/contract)

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 PIPE INSPECTION

Contrary to Section 701.03.08 of the 2012 Standard Specifications for Road and Bridge Construction and Kentucky Method 64-114, certification by the Kentucky Transportation Center for prequalified Contractors to perform laser/video inspection is not required on this contract. It will continue to be a requirement for the Contractor performing any laser/video pipe inspection to be prequalified for this specialized item with the Kentucky Transportation Cabinet-Division of Construction Procurement.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

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

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

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

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

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

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

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

HARDWOOD REMOVAL RESTRICTIONS

The Kentucky Division of Forestry has imposed a quarantine in Anderson, Boone, Bourbon, Boyd, Boyle, Bracken, Campbell, Carroll, Fayette, Franklin, Gallatin, Garrard,

Grant, Greenup, Hardin, Harrison, Henry, Jefferson, Jessamine, Kenton, Oldham, Owen, Pendleton, Scott, Shelby, Trimble, and Woodford Counties 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 county of its origin. Chipping or burning on site is the preferred method of disposal.

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

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

ACCESS TO RECORDS

The contractor, as defined in KRS 45A.030 (9) agrees that the contracting agency, the Finance and Administration Cabinet, the Auditor of Public Accounts, and the Legislative Research Commission, or their duly authorized representatives, shall have access to any books, documents, papers, records, or other evidence, which are directly pertinent to this contract for the purpose of financial audit or program review. Records and other prequalification information confidentially disclosed as part of the bid process shall not be deemed as directly pertinent to the contract and shall be exempt from disclosure as provided in KRS 61.878(1)(c). The contractor also recognizes that any books, documents, papers, records, or other evidence, received during a financial audit or program review shall be subject to the Kentucky Open Records Act, KRS 61.870 to 61.884.

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

09/26/2012

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.

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.

Special Note for Erosion Prevention and Sediment Control
Warren County / Item No 3-102.10

The Contractor shall be responsible for filing the Kentucky Pollution Discharge Elimination System (KPDES) KYR10 permit Notice of Intent (NOI) with the Kentucky Division of Water (DOW) and any KPDES local Municipal Separate Storm Sewer System (MS4) program that has jurisdiction. The NOI shall name the contractor as the Facility Operator and include the KYTC Contract ID Number (CID) for reference.

The Contractor shall perform all temporary erosion/sediment control functions including: providing a Best Management Practice (BMP) Plan, conducting required inspections, modifying the BMP plan documents as construction progresses and documenting the installation and maintenance of BMPs in conformance with the KPDES KYR10 permit dated September 30, 2003 or a permit re-issued to replace the KYR10 permit. This work shall be conducted in conformance with the requirements of Section 213 of KYTC 2008 Department of Highways, Standard Specifications for Road and Bridge Construction.

Contrary to Section 213.03.03, paragraph 2, the Engineer shall conduct inspections as needed to verify compliance with Section 213 of KYTC 2012 Department of Highways, Standard Specifications for Road and Bridge Construction. The Engineer's inspections shall be performed a minimum of once per month and within seven days after a storm of ½ inch or greater. Copies of the Engineer's inspections shall not be provided to the contractor unless improvements to the BMP's are required. The contractor shall initiate corrective action within 24 hours of any reported deficiency and complete the work within 5 days. The Engineer shall use Form TC 63-61 A for this report. Inspections performed by the Engineer do not relieve the Contractor of any responsibility for compliance with the KPDES permit.

Contrary to Section 213.05, bid items for temporary BMPs will not be listed and will be replaced with one lump sum item for the services. Payment will be pro-rated based on the Project Schedule as submitted by the Contractor and as agreed to by the Engineer.

The contractor shall be responsible for applying "good engineering practices" as required by the KPDES permit. The contractor may use any temporary BMPs with the approval of the KYTC Engineer.

The contractor shall provide the Engineer copies of all documents required by the KPDES permit at the time they are prepared.

The contractor shall be responsible for the examination of the soils to be encountered and make his own independent determination of the temporary BMPs that will be required to accomplish effective erosion prevention and sediment control.

The Contractor shall be responsible for filing the KPDES permit Notice of Termination (NOT) with the Kentucky DOW and any local MS4 program that has jurisdiction. The NOT shall be filed after the Engineer agrees that the project is stabilized or the project has been formally accepted.

Tennessee Valley Authority, 1101 Market Street, Chattanooga, TN 37402-2801

December 13, 2010

Mr. J.C. Puryear Jr.
Transportation Cabinet
Department of Highways District 3 Office
900 Morgantown Road
Bowling Green, KY 42101

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS PROJECT NO. FD04 0884 010-007, ITEM NO. 3-102.10, THREE SPRINGS ROAD, SR-884, WARREN COUNTY, KY.

Dear Mr. Puryear:

We have reviewed the plans for this project and have determined that no conflict with TVA's facilities (So. Scottsville Switching Station, Tap to North Mill 161-kV TL) will result from the construction as proposed. However, we would like to make the following comments.

1) If revisions or modifications are made in the area of TVA's right-of-way (ROW), either in design or during construction, TVA should be notified at the earliest possible time.

2) You are requested to caution your construction forces or your contractor against operating cranes or other equipment in a manner that would endanger TVA's line or personnel operating the equipment.

3) If blasting is to be done in the area of TVA's ROW, precautions should be taken to protect the transmission line structures and conductors. TVA should be notified at least 24 hours before blasting is to occur. Kentucky DOT and/or its contractors should be acquainted with the state laws and OSHA requirements concerning their responsibility in connection with construction activities near energized transmission lines.

Please direct any questions to Brian E. Williams at 423-751-7470.

Sincerely,

Mary L. Reynolds

Mary L. Reynolds
Manager, Project Development
Tennessee Valley Authority
1101 Market Street; MR 3F-C
Chattanooga, Tennessee 37402

Jeff Wolfe, Director
Phone (502) 564-3020
FAX (502) 564-7759

DIVISION OF TRAFFIC OPERATIONS

RECOMMENDATION FOR PICKUP OF ITEMS TO BE INSTALLED ON TRAFFIC SIGNALS/LIGHTING

Item Number: **3-102.10**
County: **WARREN**
Description: **US 231 @THREE SPRINGS**

Cabinets	Master code	
1	T-01-0600	Loop Detector, Model 222

Signals		
6	T-02-0009	Siemens 3 Section Signal
1	T-02-0033	Siemens 4 secton 12" signal (poly)
4	T-02-0090	Pedestrian signal housing
6	T-02-0300	LED Module 12" red arrow
6	T-02-0310	LED Module 12" yellow arrow
7	T-02-0320	LED Module 12" green arrow
1	T-02-0330	LED Module 12" red ball
1	T-02-0340	LED Module 12" yellow ball
1	T-02-0350	LED Module 12" green ball
4	T-02-0365	LED Countdown Pedestrian Module

Special items			
2	T-02-0660	Pedstl.top mntg.bkt Two-way	
2	T-02-0670	Pedestal	
4	T-06-0710	Ped Detector Pole Mount FSA Box	
4	T-06-0730	Ped Button w/o Plunger	
4	T-17-0015	9 X 15 Countdown Ped Sign DBL Sided	

Electrical Contractor Name _____
Electrical Contractor Supervisor _____ Contact number for Supervisor _____
Project Engineer _____ Contact number for Project Engineer _____
Project Engineer attests that the mentioned contractor is the actual electrical contractor on this project
Signature of Project Engineer or Designee _____

SPECIAL PROVISION FOR WASTE AND BORROW SITES

Obtain U.S. Army Corps of Engineer's approval before utilizing a waste or borrow site that involves "Waters of the United States". The Corps of Engineers defines "Waters of the United States" as perennial or intermittent streams, ponds or wetlands. The Corps of Engineers also considers ephemeral streams, typically dry except during rainfall but having a defined drainage channel, to be jurisdictional waters. Direct questions concerning any potential impacts to "Waters of the United States" to the attention of the appropriate District Office for the Corps of Engineers for a determination prior to disturbance. Be responsible for any fees associated with obtaining approval for waste and borrow sites from the U.S. Army Corps of Engineer or other appropriate regulatory agencies.

1-296 Waste & Borrow Sites
01/02/2012

Right-of-Way Certification Form

Revised 2/22/11

☐ Federal Funded ☑ Original

☑ State Funded ☐ Re-Certification

This form must be completed and submitted to FHWA with the PS&E package for federal-aid funded Interstate, Appalachia, and Major projects. This form shall also be submitted to FHWA for all federal-aid projects that fall under Conditions No. 2 or 3 outlined elsewhere in this form. When Condition No. 2 or 3 apply, KYTC shall resubmit this ROW Certification prior to construction contract Award. For all other federal-aid projects, this form shall be completed and retained in the KYTC project file.

Date: September 21, 2012

Project Name: Three Springs Road
Letting Date: October 19, 2012
Project #: 1381 JL03 114 6979901 R
County: WARREN
Item #: 03-102.10
Federal #:

Description of Project: Improve Three Springs Road to reduce congestion at intersection with Scottsville Road.

Projects that require NO new or additional right-of-way acquisitions and/or relocations

☐ The proposed transportation improvement will be built within the existing rights-of -way and there are no properties to be acquired, individuals, families, and businesses ("relocatees") to be relocated, or improvements to be removed as a part of this project.

Projects that require new or additional right-of-way acquisitions and/or relocations

☐ Per 23 CFR 635.309, the KYTC hereby certify that all relocatees have been relocated to decent, safe, and sanitary housing or that KYTC has made available to relocatees adequate replacement housing in accordance with the provisions of the current FHWA directive(s) covering the administration of the Highway Relocation Assistance Program and that at least one of the following three conditions has been met. (Check those that apply.)

☐ **Condition 1.** All necessary rights-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. Fair market value has been paid or deposited with the court.

☐ **Condition 2.** Although all necessary rights-of-way have not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. Trial or appeal of some parcels may be pending in court and on other parcels full legal possession has not been obtained, but right of entry has been obtained, the occupants of all lands and improvements have vacated, and KYTC has physical possession and right to remove, salvage, or demolish all improvements. Fair market value has been paid or deposited with the court for most parcels. Fair market value for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract. (See note 1 below.)

Note 1: The KYTC shall re-submit a right-of-way certification form for this project prior to AWARD of **all** Federal-Aid construction contracts. Award must not to be made until after KYTC has obtained full legal possession and fair market value for all parcels has been paid or deposited with the court and FHWA has concurred in the re-submitted right-of-way certification.

Right-of-Way Certification Form

Revised 2/22/11

☐ **Condition 3.** The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. However, all remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. The KYTC is hereby requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary rights-of-way will not be fully acquired, and/or some occupants will not be relocated, and/or the fair market value will not be paid or deposited with the court for some parcels until after bid letting. KYTC will fully meet all the requirements outlined in 23 CFR 635.309(c)(3) and 49 CFR 24.102(j) and will expedite completion of all acquisitions, relocations, and full payments after bid letting and prior to AWARD of the construction contract or force account construction. A full explanation and reason for this request, including identification of each such parcel and dates on which acquisitions, payments, and relocations will be completed, is attached to this certification form for FHWA concurrence. (See note 2.)

Note 2: The KYTC may request authorization on this basis only in unique and unusual circumstances. Proceeding to bid letting shall be the exception and never become the rule. In all cases, the KYTC shall make extraordinary efforts to expedite completion of the acquisition, payment for all affected parcels, and the relocation of all relocatees prior to AWARD of all Federal-Aid construction contracts or force account construction.

Approved:	Kelly R. Divine Printed Name	 Signature	Right-of-Way Supervisor
Approved:	DAVID L. ORR Printed Name	 Signature 9/26/12	KYTC, Director of ROW &Utilities
Approved:	_____ Printed Name	_____ Signature	FHWA, ROW Officer (when applicable)

Right-of-Way Certification Form

Revised 2/22/11

Date: September 21, 2012

Project Name: Three Springs Road
Project #: 1381 JL03 114 6979901 R
Item #: 03-102.10
Letting Date: October 19, 2012
County: WARREN
Federal #: _____

This project has 17 total number of parcels to be acquired, and -0- total number of individuals or families to be relocated, as well as 2 total number of businesses to be relocated.

13 Parcels where acquired by a signed fee simple deed and fair market value has been paid

4 Parcels have been acquired by IOJ through condemnation and fair market value has been deposited with the court

-0- Parcels have not been acquired at this time (*explain below for each parcel*)

-0- Parcels have been acquired or have a "right of entry" but fair market value has not been paid or has not been deposited with the court *(explain below for each parcel)*

-0- Relocatees have not been relocated from parcels ____, ____, ____, ____, ____, ____, and ____ *(explain below for each parcel)*

Parcel #	Name/Station	Explanation for delayed acquisition, delayed relocation, or delayed payment of fair market value	Proposed date of payment or of relocation

There are -0- billboards and/or -0- cemeteries involved on this project.

There are -0- water or monitoring wells on parcels ____, ____, ____, ____, and ____. All have been acquired and are the responsibility of the project contractor to close/cap.

Form Effective Date: April 1, 2006
Last Revised: February 22, 2011

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

WARREN COUNTY
JL03 114 69799 01 U
KY-884, Three Springs Road in Bowling Green
6 YRP Item No. 3-102.10

GENERAL PROJECT NOTE ON UTILITY PROTECTION
N/A)

NOTE: DO NOT DISTURB THE FOLLOWING UTILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS
List all applicable utilities whose facilities are present and are not to be disturbed during construction activities. List Utility Type, Utility Size, Utility Location for each. (List N/A or None when applicable) **<u>Tennessee Valley Authority (TVA)</u>: The Electric Company had no relocations or adjustment to their existing facilities on the subject project at the following locations: Crossing Mainline Station 468+62 from Left of Station 468+35 to and Right of Station 470+47.06.** **(See the specifications and special notes in Contract Proposal concerning the TVA facilities in Letter Dated December 13, 2010.)** **1) If revisions or modifications are made in the area of TVA's Right of Way (ROW), either in design or during construction, TVA should be notified at the earliest possible time.** **2) KYTC was requested to caution construction forces and contractor against operating cranes or other equipment in a manner that would endanger TVA's line or personnel operating equipment.** **3) If blasting is to be done in the area of TVA's ROW, precautions should be taken to protect the transmission line structures and conductors. TVA should be notified at least 24 hours before blasting is to occur. KYTC and/or its contractors should be acquainted with the state laws and OSHA requirements concerning their responsibility in connection with construction activities near energized transmission lines.**
The Contractor is fully responsible for protection of all utilities listed above

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

WARREN COUNTY
JL03 114 69799 01 U
KY-884, Three Springs Road in Bowling Green
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THE FOLLOWING COMPANIES ARE RELOCATING/ADJUSTING THEIR UTILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

List all applicable utilities whose facilities are being relocated at the time this note is written. List the Utility Type, Utility Size and Utility Location for each. If the utility's relocation work has not been completed at the writing of this note a completion date should be provided. If the work will not be completed by the letting date or it is uncertain whether the relocation work will be completed list the utility in the next block. (List N/A or None when applicable)

AT&T - KY: The Telephone Company completed its relocation by July 15, 2012 and has relocated facilities on the subject project at the following locations: Mainline: Right of and between Stations 454+00 to 459+08.

Bowling Green Municipal Utilities - General Services (FIBER): The Fiber Company completed its relocation by July 15, 2012 and has relocated facilities on the subject project at the following locations: Mainline: Right of and between Stations 454+00 to 459+08. Crossing Station 464+78.50 from Right of Station 468+52.77 to and Left of Station 465+05.

Insight Kentucky Partners II, L.P.: The Cable Television Company completed its relocation by July 15, 2012 and has relocated facilities on the subject project at the following locations: Mainline: Right of and between Stations 454+00 to 459+08. Crossing Station 464+78.50 from Right of Station 468+52.77 to and Left of Station 465+05.

Bluegrass Network LLC: The Telecommunications Company has existing fiber optics facilities Not To Be Disturbed on the subject project located at the following locations: Mainline: Right of and between Stations 454+00 to 464+00. The Telecommunications Company expects to complete its relocation on or before November 15, 2012 and has facilities to be relocated at the following locations: Mainline: Right of and between Stations 464+00 to 464+50.

SPECIAL NOTES FOR UTILITY CLEARANCE

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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

List all applicable utilities whose facilities relocation either will not be completed prior to the letting date of the road construction or that will begin and be completed by the utility after the road contract letting date. During construction these areas are not to be disturbed by or conflict with road construction activities. List Owner, Utility Type, Utility Size, both current and proposed utility location and a firm completion date for each. A completion date MUST be provided for any such utility work. (List N/A or None when applicable)

Atmos Energy Corporation: The Gas Company expects to complete its relocation on or before November 15, 2012 and has existing facilities, to be relocated on the subject project at the following locations: Mainline: Left of and between Stations 455+32.90 to 463+00; Crossing Station 456+95 from Right of Station 456+70 to and Left of Station 457+00; Left and Right of and between Stations 463+00 to 466+40; Crossing Station 465+80 and Left of and between Stations 467+00 to 470+00. Contractor shall not blast within 20' of gas main facilities. Any blasting within 300' of gas main facilities Contractor shall contact Atmos Energy a minimum of 48 hours prior to start of blasting. An Atmos Energy inspector must be on site during blasting activity.

Bowling Green Municipal Utilities (BGMU) - Electric: The Electric Company has relocated the majority of their facilities located on the subject project, at the following locations: Mainline: Right of and between Stations 454+00 to 466+10; Crossing Station 454+65; Crossing Station 459+60 from Right of Station 459+25 to and Left of Station 460+00; Crossing Station 465+05; Crossing Station 467+60 from Right of Station 466+10 to and Left of Station 468+35.
However, the proposed Storm Sewer will cross and sever the Company's existing underground electric conduit facilities relocated at the following locations: Storm Sewer Grading Sheet: Crossing Stations 14+66.79; 15+10 and 15+50. The Company, in coordination with the Road Contractor, will de-energize the electric lines within the conduit and allow the contractor to place the Storm Sewer. The Contractor shall notify KYTC and Bowling Green Municipal Utilities – Electric Division 2 weeks prior to the installation of the 36" Storm Sewer Pipe in order for BGMU to De-Energize underground primary electric lines. The Company's contractor is to repair approximately 150 linear feet of conduit at the completion of the Storm Sewer Work. The Contractor to conduct work activities and operations in cooperation with Company so that interference with Company's work will be reduced to a minimum.

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

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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 (Utility Company(s) Name). Working days will not be charged for those days on which work on (Utility Company(s) Name) facilities is delayed, as provided in the current edition of the KY Standard Specifications for Road and Bridge Construction. Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to the project, the KYTC Resident Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor.

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

List all applicable utilities whose facilities are to be relocated by the Cabinet's contractor as part of the road construction project. List Utility Type, Utility Size, and both current and proposed Utility Location for each. (List N/A or None when applicable.)

Bowling Green Municipal Utilities (BGMU) - Water & Wastewater: It has been agreed by BGMU and the Cabinet that it is in the best interest of both parties that the Cabinet's road contractor perform the work to relocate BGMU's Water and Wastewater facilities on the subject project as designed by BGMU and shown on the Cabinet's survey and general plan sheets. The Water and Sewer Company has existing water facilities Not To Be Disturbed located at the following locations: Mainline: Left of and between Stations 454+00 to 455+40. The Water and Sewer Company has existing water facilities to be relocated at the following locations: Mainline: Left of and between Stations 454+00 to 470+00; Service Crossings Stations 457+55, 461+10, 463+35, 465+90, 466+70 and 469+85; Storm Sewer: Left of and between Stations 11+00 to 15+15 and Crossing Station 15+15. The Water and Sewer Company has existing sewer facilities to be relocated at the following locations: Mainline: Right of and between Stations 454+00 to 468+00; Left of and between Stations 459+70 to 470+00 and Crossing Station 469+20 from Right of Station 468+00 to and Left of Station 469+40. See the plans, specifications and special notes in the contract proposal concerning BGMU's Water and Wastewater facilities relocations.

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

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KY-884, Three Springs Road in Bowling Green
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SPECIAL CAUTION NOTE – PROTECTION OF UTILITIES

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work proposed, it is unlikely to conflict with the existing utilities beyond minor facility adjustments. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Resident Engineer. The Kentucky Transportation Cabinet maintains the right to remove or alter portions of this contract if a utility conflict occurs.

The utility facilities as noted in the previous section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

BEFORE YOU DIG

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

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

SPECIAL NOTES FOR UTILITY CLEARANCE

IMPACT ON CONSTRUCTION

WARREN COUNTY
JL03 114 69799 01 U
KY-884, Three Springs Road in Bowling Green
6 YRP Item No. 3-102.10

AREA UTILITIES CONTACT LIST

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Contract Documents and Technical Specifications

Engineers · Architects · Planners

Three Springs Road
(KY 884)
Water and Sewer
Utility Relocation

Bowling Green
Municipal Utilities

Bowling Green, Kentucky

GRW Project No. 3980

September 2012

Bid Documents

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 01110 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE OF WORK PERFORMED UNDER THIS CONTRACT

Construction for the KY 884 – Three Springs Road – Water and Sewer Utility Relocation consisting of the relocation of various sizes and types of utilities including approximately: 3,120 L.F. of water main; 2,760 L.F. gravity sewer; 750 L.F. of water main encased in a steel casing; 155 L.F. of gravity sewer encased in a steel casing; together with all related work as specified and shown on the Drawings.

1.02 ENUMERATION OF DRAWINGS & SPECIFICATIONS

Following are the Drawings and Specifications which form the Water and Sewer Relocation:

Drawings	Sheet Number
Cover Sheet	
Plan - Mainline Sta.454+00 to Sta. 457+00	U1
Plan - Mainline Sta.457+00 to Sta. 463+00	U2
Plan - Mainline Sta.463+00 to Sta. 467+00	U3
Plan - Mainline Sta.467+00 to Sta. 470+60	U4
Plan - Mainline (US-231) Sta.24+48 – Sta. 35+00	U5
Storm Sewer Grading Sheet Sta. 10+00 – Sta. 14+00	U6
Storm Sewer Grading Sheet Sta. 14+00 – Sta. 18+00	U7
Gravity Sewer Profile – Line A	U8
Gravity Sewer Profile – Line B	U9
KY-884 Cross Section Sta. 457+50 & Sta. 461+09	U10
KY-884 Cross Section Sta. 463+09, Sta. 466+07 & Sta. 466+70	U11
KY-884 Cross Section Sta. 469+85 & Sta. 49+73 (Hospitality Ct.)	U12
US-231 Cross Section Sta. 25+35	U13
Water Line Details	U14
Fire Protection Vault Details	U15
Manhole Details	U16
Manhole Details	U17
Manhole Cover Details	U18
Sanitary Sewer Details	U19
Erosion Control Details	U20
Erosion Control Details	U21
Quantities Sheet	U22

Specifications

See Table of Contents

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01125 – SPECIAL PROVISIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. The Contractor shall coordinate the project schedule such that the Water and Sanitary Sewer Utility relocation portion of this project is completed prior to beginning any Highway work.

B. The Contractor shall perform the utility relocation (Water and Sanitary Sewer) work in a continuous 20-week time frame. If the Contractor fails to complete the work in the given time frame, he will be responsible for the Residents Inspector's time and expenses.

1.02 COORDINATION WITH OTHER UTILITIES

A. The locations of the existing utilities are show to the best information available. Prior to construction, the Contractor shall work with the local utility companies to verify locations and depths (by probing, excavation and/or vacuum excavation) of the existing utility lines. This work is not a pay item.

B. Contractor shall note that the construction of the new sewer will be performed in close proximity to other active utilities, both above and below grade. The Contractor shall include in his pay item any associated cost for working around other utilities. This shall include any cost for loss in production, temporary supports, temporary bracing and/or the use of trench boxes. The Contractor shall coordinate this work with the other utility as required.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01271 - BASIS OF MEASUREMENT AND PAYMENT – UNIT PRICE

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. The Contractor shall furnish all necessary labor, machinery, tools, apparatus, equipment, materials, service and other necessary supplies and perform all Work shown on the Drawings and/or described in the Specifications and Contract Documents at the unit prices as indicated by the Bidder in the Bid.

B. The Bidder declares that he has examined the site of the Work and informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Plans, Specification and Contract Documents for the Work, and has read all special provisions furnished prior to the opening of bids; and that he has further satisfied himself relative to the Work to be performed. The Bidder further declares that he understands that unit quantities shown in the Proposal are approximately only, are subject to increase or decrease, and that, should the quantities of any of the items be decreased, the Bidder will make no claim for the anticipated profits. In addition, the Owner also reserves the right to adjust quantities, either by addition or deletion and as-BID unit price shall remain in effect for these quantity adjustments.

C. The Contractor shall note that all excavation is unclassified. No separate payment will be made for rock excavation.

D. No extra payment will be made for increase in pipe cover from the minimum of 36-inches. It is probable that over excavation will be required to avoid existing utilities and to comply with the proposed earthwork and storm drainage features included in the roadway project, in addition to the notations included on the Drawings.

E. All work (water and sewer) shall be in accordance with the latest revision of the Kentucky Plumbing code. The Contractor is responsible for all permits, fees, and coordination of work with the State Plumbing Inspector.

F. The Contractor shall be responsible for removing, hauling, and properly disposing of all excavated materials at no additional cost to the Owner.

1.02 PAY ITEMS

A. The items listed hereinafter refer to and are the same items listed in the PROPOSAL hereinbefore and constitute all of the pay items in this Contract. Any other items of Work listed in the Specifications or shown on the Drawings shall be considered incidental to the above items.

1.03 WATER MAIN AND WATER SERVICE

A. Payment for furnishing and installing the water main or service line will be made at the contract unit price per linear foot, complete in place, which price shall include compensation for furnishing, hauling, excavation (including rock), extra depth as required, bedding, laying, installation of pipe location tape, jointing, testing, backfilling

(excluding flowable fill where required), geotextile fabric materials (where required), surface restoration (except pavement replacement), disinfection and cleanup. The quantity of water line to be paid for shall be the length of the complete water main measured along the centerline without any deduction for lengths of fittings, valves or other appurtenances.

B. It should be noted that construction of this item will be performed in close proximity to other active utilities, both above and below grade. The Contractor shall include in his price any additional cost for working around other utilities, such as, coordination with other utilities, locating other utilities by excavation (potholing), trench boxes as needed, supporting, bracing and loss of production. No additional pay will be granted for such items.

1.04 STEEL COVER PIPE-BORED AND JACKED

A. The steel cover pipe required to be bored and jacked (or push bored where noted) of sizes indicated will be measured from end to end of the completed cover pipe in place, and will be paid for per bore at the contract unit price per foot complete in place, which price shall include the cover pipe, **carrier pipe laid therein**, material and work for blocking the ends, supporting and bracing the carrier pipe and all other items necessary for its construction as shown on the Drawings and/or described in the Specifications.

B. Existing utilities, mains or services that fall within the bore or receiving pits shall be the responsibility of the Contractor. Contractor shall temporarily support (or relocate) utilities as required for each bore pit. Payment for this work shall be included in this pay item.

C. Bore (or receiving) pits located in the proposed road limits shall be backfilled as shown on the Typical Backfilling and Bedding Methods Standard Drawings and/or described in the Specifications, unless otherwise approved by the Owner, Engineer and the Department of Transportation.

1.05 STEEL COVER PIPE - OPEN CUT

A. The steel cover pipe required to be open cut installed (to the elevations provided) in place, of the sizes indicated on the Drawings, will be measured from end to end of the completed cover pipe in place and will be paid for at the contract unit price per foot complete in place. Price shall include the cover pipe, **carrier pipe laid therein**, material and work for blocking the ends of the cover pipe, supporting and bracing carrier pipe, crushed stone backfill, (flowable fill excluded where required), geotextile fabric material (where required) surface restoration (except pavement replacement) and all other items necessary for its construction as shown on the Drawings and/or described in the Specifications.

1.06 CUT & CAP EXISTING WATER MAIN

A. Payment for cutting and capping existing water mains of all sizes and types shown on the Drawings will be made at the contract unit price each, complete in place, which price shall include compensation for furnishing and installing all pipe, fittings, hauling, excavation, thrust restraint fitting, cutting, placement of ductile iron cap, backfilling (excluding flowable fill, where required) geotextile fabric (where required), and all other

work and material required for abandoning existing water mains as specified and/or shown on the Drawings.

B. Pavement replacement is a separate pay item and is **not** included in the scope of this pay item.

1.07 INSTALL NEW WATER METER, SERVICE LINE & RECONNECT EXISTING YARD LINE

A. Payment for new customer meter and service connections of the various sizes and configurations will be made at the contract unit price each, complete in place, which shall include compensation for tapping the water main and furnishing and installing service connector or corporation stop, furnishing and setting meter box, the meter and cover, and all coupling, fittings, etc. to reconnect to the existing yard line.

B. This pay item also includes up to 10' L.F. of service piping necessary to make the connection from the new main line to the meter box and from the meter to the existing yard line, together with all related appurtenances specified and/or shown on the Drawings necessary to provide customer connections.

C. Flowable backfill for services beneath existing roadways is a separate pay item.

D. Surface restoration (except pavement replacement) and geotextile fabric material (where required) are included under the scope of this pay item.

1.08 REMOVAL OF EXISTING WATER METER AND BOX (OR CONCRETE VAULT ASSEMBLY)

A. Payment for removal of existing water meters and boxes (or concrete vaults) shall be made at the contract unit price each, complete, and shall include all labor, materials and equipment necessary for excavation, removing and disposing of the existing water meter, water main, meter box (or vault) and properly abandoning (capping) the existing water service line. Also, shall include backfilling (excluding flowable fill where required), geotextile fabric (where required), surface restoration (except pavement replacement) and all other work and materials to remove the existing water meter and box (or vault).

1.09 INSTALL PRIVATE FIRE PROTECTION ASSEMBLY

A. Payment for furnishing and installing the private fire hydrant assembly shall be made at the contract unit price each complete in place. Which price shall include excavation, the block vault, concrete top slab, hatches, stone base, concrete footers, and supports, valves, detector meter, post indicator and valve, 4" fire department connection pipe (Siamese connection), flanged pipe and fittings, backfill, and surface restoration (except pavement replacement), together with all items shown on the detail drawings.

1.10 REMOVE EXISTING FIRE DEPARTMENT CONNECTION FOR PRIVATE FIRE LINE

A. Payment for removal of existing private fire department connection assemblies will be made at the contract unit price, per each assembly removed, which price will include compensation for excavation, removal, disposal, hauling, and backfill. Price shall include

removal of hydrant and piping to mainline tee and providing permanent cap and thrust block for same.

1.11 FIRE HYDRANT AND VALVE

A. Payment for furnishing and installing 6" pipe hydrant lead (excluding wet tap and/or ductile iron water main tee), 6" hydrant lead gate valve and box, and the fire hydrant, including thrust blocks, crushed stone drain, and anchorage will be made at the contract unit price each, complete in place. Type of hydrant lead pipe shall be as noted on the Drawings.

1.12 REMOVE EXISTING FIRE HYDRANT ASSEMBLY

A. Payment for removal of existing fire hydrant assemblies will be made at the contract unit price, per each assembly removed, which price will include compensation for excavation, removal, disposal, hauling, and backfill. Price shall include removal of hydrant and piping to mainline tee and providing permanent cap and thrust block for same.

1.13 REMOVAL OF EXISTING VALVE BOXES

A. Payment for removing the existing valve boxes will be made at the contract unit price each. Price shall include compensation for cutting the existing blacktop, excavating as needed, removing the existing valve box, backfilling (excluding flowable fill where required), surface restoration (except pavement replacement) and all other work and materials to remove the existing water valve box (on water mains to be abandoned).

1.14 CONNECTIONS TO EXISTING WATER MAINS (WET TAP)

A. Where shown on the Drawings or directed by the Engineer, payment for the connections made to existing water mains of the various sizes and configurations shown on the Drawings will be made at the contract unit price for each connection made, complete in place, which price shall include compensation for furnishing and installing all pipes, fittings, tapping sleeves, tapping valves and boxes, hauling, excavation (including rock), installation, backfilling (flowable fill excluded where required), geotextile fabric material (where required), surface restoration (except pavement replacement), and all other work and material required for making the connection to the existing main.

1.15 DUCTILE IRON FITTINGS

A. Payment for furnishing and placing ductile iron fittings will be made at the contract unit price per ton, complete in place. Price shall include all jointing material and where required, restraint systems (excluding concrete thrust blocks).

1.16 GATE VALVES AND BOXES

A. Payment for furnishing and installing gate valves and boxes will be made at their respective contract unit price each, complete in place, which price shall include compensation for furnishing, hauling, excavation, installation, blocking and backfilling.

1.17 GRAVITY SEWERS

A. Payment for gravity sewer lines of the different types and sizes will be made at the contract unit price per linear foot in place, which price will include compensation for furnishing pipe, all trenching (including rock excavation), bedding, laying, jointing, testing, backfilling, (excluding flowable fill where required), filter fabric and crushed stone (where required), surface restoration (except pavement replacement) connections to new manholes, and all plugs as required. The quantity of sewer to be paid for shall be the length of pipe measured along the centerline of the completed pipeline without deducting the length of branches, fittings and manhole inverts.

B. Connections of existing sewers to new sewers will be additional and not included under the scope of this pay items.

C. It should be noted that construction of this item will be performed in close proximity to other active utilities, both above and below grade. The Contractor shall include in his price any additional cost for working around other utilities, such as, coordination with other utilities, locating other utilities by excavation (potholing), trench boxes as needed, supporting, bracing and loss of production. No additional pay will be granted for such items.

D. **The Contractor shall note that all excavation is unclassified. No separate payment will be made for rock excavation.**

1.18 MANHOLES

A. Payment for shallow, standard, or special manholes, as described, will be made at the contract unit price each, complete in place, which price will include the manhole, complete with footing, precast concrete riser sections and cone (or flat slab top), cast iron frame and cover, inverts, steps, stub outs (where required), excavation (including rock), backfilling, (excluding flowable fill where required) surface restoration (except pavement replacement), and testing.

B. Note the maximum height for manhole grade rings is 12-inches.

C. It should be noted that construction of this item will be performed in close proximity to other active utilities, both above and below grade. The Contractor shall include in his price any additional cost for working around other utilities, such as, coordination with other utilities, locating other utilities by excavation (potholing), trench boxes as needed, supporting, bracing and loss of production. No additional pay will be granted for such items.

1.19 CONSTRUCTION OF NEW MANHOLE OVER EXISTING GRAVITY SEWER LINE

A. Payment for construction of new manholes over existing gravity sewer shall be made at the contract unit price each. The work shall include all appurtenances of a standard or shallow manhole, as described above, except that the foundation shall be cast-in-place around the existing pipe. This item shall also include placing the manhole sections over the existing sewer pipe on the newly poured foundation, all grouting and waterproofing needed to seal the manhole around the existing sewer pipe.

B. The existing gravity sewer lines through new manholes shall remain in service until the sanitary sewer has been tested and approved. The top of the existing sewer pipe shall then be removed from the manhole.

C. Also included in this Pay Item shall be plugging of the existing sewer line opening that will be abandoned.

1.20 MANHOLE BARREL EXTENSION

A. For manholes greater than six (6) feet in depth, the additional manhole barrel measured as defined in the Detailed Specifications will be paid for at the contract unit price per vertical foot of additional depth, which price will include the precast concrete barrel sections, water proof seals, excavation (including rock) and backfilling (excluding flowable fill where required. No separate payment will be made for additional steps that are required. Depth of manhole shall be measured vertically from the top of cast iron frame to the downstream invert.

B. Note the maximum height for manhole grade rings is 12-inches.

1.21 MANHOLE DROP CONNECTIONS

A. Payment for manhole drop connection will be made at the contract unit price for each drop constructed, regardless of size, which price includes excavation, bedding, concrete, furnishing all pipe, fittings, saddles, gaskets, compression couplings and stainless steel straps, backfill and surface restoration (except pavement replacement), and testing.

1.22 CONNECT NEW SEWER TO EXISTING MANHOLE

A. Payment for the installation of gravity sewer to an existing manhole shall be made at the Contract unit price each in-place. This cost will include all labor, material, and equipment to install the gravity sewer through the wall of the existing manhole, patch the manhole wall, remove the existing apron and invert and construct a new apron and invert, plugging the existing pipes that are to be abandoned, and all other items needed to connect a gravity sewer to the existing manhole in accordance with these plans and detailed specifications. All concrete, pipe, plugs, sealant, etc. shall be considered a part of this pay item.

1.23 REMOVAL OF MANHOLES IN ROADWAY

A. Payment for the removal of existing manholes located in the roadway will be made at the contract unit price each, price will include excavation, complete removal of the manhole, hauling, disposal and backfilling (flowable fill excluded where required) and surface restoration (except pavement replacement). Price shall also include plugging of the existing sewer lines entering and exiting the manhole.

1.24 REMOVAL OF MANHOLE NOT IN ROADWAY

A. Payment for the removal of existing manholes not located in the roadway will be made at the contract unit price each, price will include excavation, removal of the top section(s) of

the manhole (removal required to be 2 feet below final grade), plugging sewer pipe within the manhole, hauling, disposal and stone backfilling to top of structure, earthen backfill from top of structure to finished grade (flowable fill excluded where required) and surface restoration (except pavement replacement).

1.25 PLUG EXISTING/NEW SEWER SERVICE LINE (ALL SIZES)

A. Payment for plugging sewer service lines (all sizes) shall be made at the contract unit price each and shall include all labor, material, backfill (excluding flowable fill where required) and equipment to plug the sewer in accordance with these plans and specifications.

1.26 RECONNECTION OF EXISTING SEWER SERVICE LINE TO NEW GRAVITY SEWER

A. Payment for reconnections of existing sewer line of the various sizes and configurations will be made at the contract unit price each, complete in place, which price shall include compensation for all labor, materials, excavation (including rock), installing the wye fitting 10 LF of service piping to connect to existing service piping, couplings, fittings, etc. required to make the new connection, plugging/abandoning service line, backfill, (flowable fill excluded where required), geotextile fabric material (where required), surface restoration (except pavement replacement), materials and labor necessary to complete the work.

1.27 SAFE LOADING ABANDONED LINES

A. Payment for safe loading abandoned lines of all sizes and types of pipes by means of injecting grout shall be made at the contract unit price per cubic yard, which price shall include all labor, materials, equipment and services necessary for blocking (plugging or capping) the downstream portion of the abandoned pipe (in a manner acceptable to the Engineer), and in accordance with KDOH Section 708, of their standard specifications. This includes all excavation (including rock), backfilling (except flowable fill) and surface restoration (except pavement replacement).

1.28 BY-PASS PUMPING

A. Payment for by-pass pumping will be made at the contract unit price per hour of operation. Any cost associated with pumping set-up operation and temporary plugging of the sewer shall be considered incidental to this item. Any by-pass pumping shall be authorized by the Engineer/Owner.

1.29 FLOWABLE BACKFILL UNDER ROADS & HIGHWAYS

A. Payment for flowable backfill under existing roadways as specified or indicated on the drawings shall be made at the contract unit price per cubic yard, complete in place.

B. Payment will **not** be made for flowable backfill in areas resulting from neglect or carelessness by the Contractor.

1.30 CONCRETE FOR CRADLE, ANCHORS, CAPS, AND ENCASEMENT

A. Payment for concrete cradles, anchors, thrust blocks, and encasement will be made at the contract unit price per cubic yard, complete in place.

1.31 REMOVING AND REPLACING CONCRETE CURB AND GUTTER

A. Payment for concrete curb and gutter replacement will be made at the contract unit price per linear foot of curb and gutter, complete in place, which price shall include compensation for removing existing curb and gutter, hauling, excavation (including rock), installing new concrete curb and gutter, backfilling per standard details (excluding flowable fill), cleanup and surface restoration.

B. Payment will **not** be made for curb damaged by the Contractor outside the actual construction limits or through neglect or carelessness. Tunneling under curb and gutter is **not** a separate pay item.

1.32 BITUMINOUS CONCRETE PAVEMENT REPLACEMENT (HIGHWAY, STREET AND DRIVEWAY REPLACEMENT)

A. Pavement replacement for bituminous concrete highway, street, and driveway will be paid for at the contract unit price per linear foot of trench paved, which price will include compensation for furnishing and placing crushed stone trench backfill in accordance with the Standard Drawings (flowable fill excluded where required), furnishing and placing base course for paving, placing the concrete sub-slab (per Standard Details) and furnishing and laying bituminous concrete surface. Payment for this item will be upon approval of KDOT, the Owner, the Engineer and the Private Property Owner (as applicable).

1.33 AGGREGATE SURFACE REPLACEMENT

A. Payment for replacement of gravel or crushed stone surfaces, such as driveways and parking areas, will be made at the contract unit price per linear foot of trench resurfaced, which price includes furnishing and placing a six (6) inch compacted thickness course of DGA at top of trench to grade. Compaction of trench backfill, or granular material in lieu of same, Method "2" backfill, is **not** a separate pay item.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01310 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

Minimum administrative and supervisory requirements necessary for coordination of work on the project include but are not necessarily limited to the following:

A. Coordination and meetings.

B. Limitations for use of site.

C. Coordination of crafts, trades and subcontractors.

D. General installation provisions.

E. Cleaning and protection.

F. Conservation and salvage.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.03 COORDINATION AND MEETINGS

A. Monthly general project coordination meetings will be held at regularly scheduled times convenient for all parties involved. These meetings are in addition to specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Representation at each meeting by every party currently involved in coordination or planning for the work of the entire project is requested. Meetings shall be conducted in a manner which will resolve coordination problems. Results of the meeting shall be recorded and copies distributed to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.04 LIMITATIONS ON USE OF THE SITE

A. Limitations on site usage as well as specific requirements that impact site utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements, allocation of available space shall be administered equitably among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1.05 COORDINATION OF CRAFTS, TRADES AND SUBCONTRACTORS

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

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

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

D. Each subcontractor is expected to be familiar with the General Requirements and all sections of the detailed Specifications for all other trades and to study all Drawings applicable to his work including Architectural and Structural Drawings, to the end that complete coordination between trades will be effected. Consult with the Engineer if conflicts exist on the Drawings.

E. Special attention shall be given to points where ducts or piping must cross other ducts or piping, where lighting fixtures must be recessed in ceilings and where ducts, piping and conduits must fit into walls and columns. It shall be the responsibility of such subcontractor to leave the necessary room for other trades.

F. No extra compensation will be allowed to cover the cost of removing piping, conduit, ducts, etc., or equipment found encroaching on space required by others.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01320 - PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Scheduling Responsibilities:

1. In order to provide a definitive basis for determining job progress, a construction schedule of a type approved by the Owner will be used to monitor the project.

2. The Contractor shall be responsible for preparing the schedule and updating on a monthly basis. It shall at all times remain the Contractor's responsibility to schedule and direct his forces in a manner that will allow for the completion of the work within the contractual period.

B. Construction Hours:

1. No work shall be done between 6:00 p.m. and 7:00 a.m. nor on Saturdays, Sundays or legal holidays without the prior written permission of the Owner. However, emergency work may be done without prior written permission.

2. If the Contractor, for his convenience and at his own expense, should desire to carry on his work at night or outside the regular hours, he shall submit a written request to the Engineer and shall allow nine (9) days for satisfactory arrangements to be made for inspecting the work in progress. If permission is granted, the Contractor shall light the different parts of the project as required to comply with all applicable federal, state, and local regulations. The Contractor shall also revise his schedule as appropriate at the next monthly schedule update meeting to reflect the changes in working hours.

C. Progress of the Work:

1. The work shall be started within ten (10) days following the Notice to Proceed and shall be executed with such progress as may be required to prevent delay to other Contractors or to the general completion of the project. The work shall be executed at such times and in or on such parts of the project, and with such forces, material and equipment, to assure completion of the work in the time established by the Contract.

2. The Contractor agrees that whenever it becomes apparent from the current monthly schedule update that delays have resulted and, hence, that the Contract completion date will not be met or when so directed by the Owner, he will take some or all of the following actions at no additional cost to the Owner:

a. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of work.

b. Increase the number of working hours per shift, shifts per working day or days per week, the amount of construction equipment, or any combination of the foregoing to substantially eliminate the backlog of work.

c. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities, and comply with the revised schedule.

d. The Contractor shall submit to the Owner or the Owner's representative for review a written statement of the steps he intends to take to remove or arrest the delay to the critical path in the accepted schedule. If the Contractor should fail to submit a written statement of the steps he intends to take or should fail to take such steps as required by the Contract, the Owner may direct the level of effort in manpower (trades), equipment, and work schedule (overtime, weekend and holiday work, etc.), to be employed by the Contractor in order to remove or arrest the delay to the critical path in the accepted schedule, and Contractor shall promptly provide such level of effort at no additional cost to the Owner.

1.02 CONSTRUCTION SCHEDULE

A. Within ten (10) calendar days of the Notice to Proceed, the Contractor shall submit to the Engineer five (5) copies of his proposed schedule. The schedule will be the subject of a schedule review meeting with the Contractor, the Engineer and the Owner or the Owner's representative within one (1) week of its submission. The Contractor will revise and resubmit the schedule until it is acceptable and accepted by the Owner or the Owner's representative.

1.03 SUBMITTAL SCHEDULE

A. In addition to the above scheduling requirements, the Contractor will be required to submit a complete and detailed listing of anticipated submittals during the course of the Contract. The Contractor will coordinate his submittals with those of his Subcontractors and Suppliers and will identify each submittal by Contract drawing number and specification number. The anticipated submission date for each submittal must be indicated along with the date on which its return is anticipated. For planning purposes, the Engineer will usually return shop drawings thirty (30) days after receipt. However, longer durations for review will not be considered a basis for a claim.

B. The Submittal Schedule must be submitted within twenty (20) working days of the Notice to Proceed and will be the subject of a special meeting with the Engineer and the Owner or the Owner's representative within one (1) week of the schedule's submission. At that meeting, the Submittal Schedule will be reviewed for comprehensiveness and feasibility. The Engineer will adjust the projected return dates based on the need for more or less time for each submittal's review. The Submittal Schedule will then be accepted or revised as required.

1.04 SCHEDULE UPDATES

A. Monthly Meetings:

A monthly Schedule Update Meeting will be held in conjunction with the applicable progress meeting at the construction site to review and update the Schedule. The Schedule Update Meetings will be chaired by the Owner or the Owner's representative and attended by the Contractor and the Engineer. Actual progress of the previous month will be recorded and future activities will be reviewed. The duration of activities and their logical connections may be revised as needed. Decisions made at these meetings

and agreed to by all parties are binding with the exception that no contractual completion dates will be modified without formal written requests and acceptance as specified herein.

B. Revisions to Schedule:

The Schedule shall be formally revised if any of the following conditions are encountered:

1. When a delay in completion of any work item or sequence of work items results in an indicated extension of the project completion.

2. When delays in submittals or deliveries or work stoppages are encountered which make replanning or rescheduling of the work necessary.

3. When the schedule does not represent the actual prosecution and progress of the project.

1.05 CONTRACT COMPLETION TIME

A. Causes for Extensions:

The Contract completion time will be adjusted only for causes specified in this Contract. In the event the Contractor requests an extension of any Contract completion date, he shall furnish such justification and supporting evidence as the Owner or the Owner's representative may deem necessary for a determination as to whether the Contractor is entitled to an extension of time under the provisions of this Contract. The Owner, with the assistance of the Engineer, will, after receipt of such justification and supporting evidence, make findings of fact and will advise the Contractor in writing thereof.

B. Requests for Time Extension:

Each request for change in any Contract completion date shall be initially submitted to the Owner within the time frame stated in the General Conditions. All information known to the Contractor at that time concerning the nature and extent of the delay shall be transmitted to the Owner at that time. Within the time frame stated in the General Conditions but before the date of final payment under this Contract, all information as required above concerning the delay must be submitted to the Owner. No time extension will be granted for requests which are not submitted within the foregoing time limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND RFI'S

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. General: This section specifies procedural requirements for non- administrative submittals including shop drawings, product data, samples (when samples are specifically requested) and other miscellaneous work-related submittals. Shop drawings, product data, samples and other work-related submittals are required to amplify, expand and coordinate the information contained in the Contract Documents.

B. Refer to other Division-1 sections and other Contract Documents for Specifications on administrative, non-work-related submittals. Such submittals include, but are not limited to the following items:

1. Permits.
2. Payment applications.
3. Performance and payment bonds.
4. Insurance certificates.
5. Inspection and test reports.
6. Schedule of values.
7. Progress reports.
8. Listing of subcontractors.
9. Operating and Maintenance Manuals

C. Engineer prefers initial submittals be in electronic media along with one paper copy for review. Engineer utilizes Newforma software and will provide Contractor with the necessary links and instructions for submittal purposes. If Contractor does not have capability to submit electronic submittals, then Contractor shall submit a request to Engineer for waiver. In the event a waiver is granted, paper submittals shall be provided as directed by the Engineer.

D. Submittals shall be checked and reviewed by the Contractor and stamped with Contractor's review stamp before submission to the Engineer. The review of the submittals 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 submittals 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.

E. All Requests for Information (RFI) to Engineer shall be submitted electronically via Engineer's Newforma software.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

B. Section 01780 - Operating and Maintenance Manuals.

1.03 DEFINITIONS

A. Shop drawings are technical drawings and data that have been specially prepared for this project, including but not limited to the following items:

1. Fabrication and installation drawings.
2. Setting diagrams.
3. Shopwork manufacturing instructions.
4. Templates.
5. Patterns.
6. Coordination drawings (for use on-site).
7. Schedules.
8. Design mix formulas.
9. Contractor's engineering calculations.

Standard information prepared without specific reference to a project is not considered to be shop drawings.

B. Product data includes standard printed information on manufactured products that has not been specially-prepared for this project, including but not limited to the following items:

1. Manufacturer's product specifications and installation instructions.
2. Standard color charts.
3. Catalog cuts.
4. Roughing-in diagram and templates.
5. Standard wiring diagrams.
6. Printed performance curves.
7. Operational range diagrams.
8. Mill reports.
9. Standard product operating and maintenance manuals.

C. Samples, where specifically required, are physical examples of work, including but not limited to the following items:

1. Partial sections of manufactured or fabricated work.

2. Small cuts or containers of materials.

3. Complete units of repetitively-used materials.

4. Swatches showing color, texture and pattern.

5. Color range sets.

6. Units of work to be used for independent inspection and testing.

D. Miscellaneous submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

1. Specially-prepared and standard printed warranties.

2. Maintenance agreements.

3. Workmanship bonds.

4. Survey data and reports.

5. Testing and certification reports.

6. Record drawings.

7. Field measurement data.

1.04 SUBMITTAL PROCEDURES

A. General: Refer to the General Conditions and Paragraph 1.02A hereinbefore for basic requirements for submittal handling.

B. Coordination: Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity.

It is the Contractor’s responsibility to make such field measurements as are needed to base submittals on actual field conditions to assure proper connection, fit, function and performance of all work and equipment in the execution of the contract work.

Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the Architect/Engineer's need to review a related submittal. The Architect/Engineer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

C. Coordination of Submittal Times: Prepare and transmit each submittal to the

Architect/Engineer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Architect/Engineer's need to review submittals concurrently for coordination.

D. Review Time: Allow sufficient time so that the installation will not be delayed as a result of the time required to properly process submittals, including time for resubmittal, if necessary. Advise the Architect/Engineer on each submittal, as to whether processing time is critical to the progress of the work and if the work would be expedited if processing time could be shortened.

1. Allow a longer time period where processing must be delayed for coordination with subsequent submittals. The Architect/Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination.

2. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect/Engineer sufficiently in advance of the work.

E. Submittal Preparation: Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of action taken.

1. Project name.

2. Date.

3. Name and address of Architect/Engineer.

4. Name and address of Contractor.

5. Name and address of subcontractor.

6. Name and address of supplier.

7. Name of manufacturer.

8. Number and title of appropriate specification section.

9. Drawing number and detail references, as appropriate.

10. Similar definitive information as necessary.

F. 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). Include only one item in a submittal.

G. The Contractor shall review and check submittals, and shall indicate his review by initials and date. Any submittal received without this evidence of review shall be returned to the Contractor without review.

H. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer in writing of the deviation and the reasons therefore.

I. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect/Engineer, and to other destinations as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender "without action".

J. Electronic Submittals: If the electronic method of submittals is agreed to by Contractor, Engineer, and Owner, the format and procedures will be determined and implemented prior to any submittals. Submittals will be processed through “Newforma” software. Each item of the submittal documents shall be in .pdf format and shall be oriented so that they are read from upper left corner to lower right corner, with no rotation of said document being required after receiving it. The .pdf file shall be named so that it describes the item being submitted. All other requirements herein are part of the electronic submittal process with the exception of the duplicate copies. Contractor stamp indicating review and any comments or notes must be on the .pdf submittal.

1.05 SPECIFIC SUBMITTAL REQUIREMENTS

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

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 four (4) which will be retained by the Engineer. Shop drawings shall be folded to an approximate size of 8-1/2" x 11" and in such manner that the title block will be located in the lower right-hand 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. 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.

E. 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.

F. Submittals for all electrically operated items (including instrumentation and controls) shall include complete size, color coding, all terminations and connections, and coordination with related equipment.

G. 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.

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

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

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

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

1.06 REVIEW STATUS

A. Submittals will be returned, stamped with the following classifications: "Reviewed", "Furnish as Corrected", "Revise and Resubmit", "Rejected", or "Submit Specified Item".

B. In some instances, corrections to dimensions or clarification notations will be required, in which case the drawings will be marked "Furnish as Corrected." These shop drawings will not be required to be resubmitted for further approval unless the submittal has been marked "Resubmit Record Copy." If the supplier makes additional modifications after receiving a "Furnish as Corrected" disposition, the drawings must then be resubmitted for review.

C. If the shop drawing is returned with the notation "Revise and Resubmit", the Contractor shall promptly make the revisions indicated and repeat the initial approval procedure.

D. If the shop drawing is returned with the notation "Submit Specified Item", this indicates that the submittal does not meet the specification, will not be reviewed, and is unacceptable. Upon return of a drawing so marked, the Contractor shall repeat the initial approval procedure, submitting acceptable materials or equipment.

E. The "Rejected" notation is used to indicate materials or equipment that are not acceptable and are not included in the project.

1.07 REMINDER OF CONTRACTOR RESPONSIBILITIES

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

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

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

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

E. It is emphasized that the review of shop drawings by the Engineer is for general conformance to the Contract Drawings and Specifications, but subject to the detailed requirements of the Contract Drawings and Specifications. Although the Engineer may check submitted data in more or less detail, such checking is an effort to discover errors and omissions in the Contractor's drawings and to assist the Contractor in coordinating and expediting his work, but shall in no way relieve the Contractor of his obligation and responsibility to properly coordinate the work, and to Engineer the details of the work in such a manner, that the purpose and intent of the Contract will be achieved nor shall any such detailed checking by the Engineer be construed as placing on him or on the Owner, any responsibility for the accuracy, proper fit, functioning or performance of any phase of the work included in this Contract. The Contractor is responsible for confirmation and correlation of dimensions at the job site; for information that pertains solely to the fabrication processes or to the techniques of construction; for the coordination of the work of all trades; and for performance of his work in a safe and satisfactory manner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01631 - PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. General: Substitution of materials and/or equipment is defined in Paragraph 6.7.1 of the General Conditions and more fully hereinafter.

B. Definitions: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents including such terms as "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction" and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term "product" as used herein includes the terms "material", "equipment", "system" and other terms of similar intent.

2. "Named Products" are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the Contract Documents.

3. "Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work.

4. "Equipment" is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.

C. Substitutions: The Contractor's requests for changes in the products, materials, equipment and methods of construction required by the Contract Documents are considered requests for "substitutions", and are subject to the requirements specified herein. The following are not considered as substitutions:

1. Revisions to the Contract Documents, where requested by the Owner, Engineer are considered as "changes" not substitutions.

2. Substitutions requested during the bidding period, which have been accepted prior to the Contract Date, are included in the Contract Documents and are not subject to the requirements for substitutions as herein specified.

3. Specified Contractor options on products and construction methods included in the Contract Documents are choices available to the Contractor and are not subject to the requirements for substitutions as herein specified.

4. Except as otherwise provided in the Contract Documents, the Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders.

D. Standards: Refer to Division-1 section "Definitions and Standards" for applicability of industry standards to the products specified for the project, and for acronyms used in the text of the specification sections.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to Work of this Section.

1.03 SUBMITTALS

The information required to be furnished for evaluation of product substitution will be as follows:

A. Performance capabilities, and materials and construction details will be evaluated based upon conformance with the Specifications. Products that do not conform with the Specification shall not be accepted.

B. Manufacturer's production and service capabilities, and evidence of proven reliability will be acceptable if the following is furnished.

1. Written evidence that the manufacturer has not less than (3) years experience in the design and manufacture of the substitute product.

2. Written evidence of at least one application, of a type and size similar to the proposed substitute product, in successful operation in a wastewater treatment plant for a period of at least one year.

3. In lieu of furnishing evidence of a manufacturer's Experience and successful operation of an application of the product to be substituted, the Contractor has the option of furnishing a cash deposit or bond which will guarantee replacement if the product the furnished does not satisfy the other requirements specified in this section. The amount of each deposit or bond will be subject to the approval.

C. Specific reference to characteristics either superior or inferior to specified requirements will be evaluated based on their net effect on the project. Products with any characteristics inferior to those specified will not be acceptable unless offset by characteristics that, in the opinion of the Engineer, will cause the overall effect of the product on the project to be at least equal to that of those specified.

1.04 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.

B. Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents, but must be provided by the Contractor.

C. The detailed estimate of operating and maintenance costs will be evaluated based on comparison with similar data on the specified products. Proposed substitute products which have an operating and maintenance cost that, in the opinion of the Engineer, exceeds that of the specified products will not be considered equal and will not be acceptable.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

General: Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Control delivery schedules to minimize long-term storage at the site and to prevent overcrowding of construction spaces. In particular coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily dam aged, or sensitive to deterioration, theft and other sources of loss.

A. Deliver products to the site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

B. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

C. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

PART 2 - PRODUCTS

2.01 GENERAL PRODUCT COMPLIANCE

A. General: Requirements for individual products are indicated in the Contract Documents; compliance with these requirements is in itself a Contract Requirement. These requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

1. Proprietary.

2. Descriptive.

3. Performance.

4. Compliance with Reference Standards.

Compliance with codes, compliance with graphic details, allowances, and similar provisions of the Contract Documents also have a bearing on the selection process.

B. Procedures for Selecting Products: Contractor's options in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects.

2.02 SUBSTITUTIONS

A. Conditions: Contractor's request for substitution will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the request are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, all as judged by the Engineer; otherwise the requests will be returned without action except to record non-compliance with these requirements.

1. The Engineer will consider a request for substitution where the request is directly related to an "or equal" clause or similar language in the Contract Documents.

2. The Engineer will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.

3. The Engineer will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

4. The Engineer will consider a request for a substitution where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Engineer for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.

5. The Engineer will consider a request for substitution when the specified product or method cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.

6. The Engineer will consider a request for substitution when the specified product or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

7. The Engineer will consider a request for substitution when the specified product or method cannot receive a warranty as required by the Contract Documents and where the Contractor certifies that the proposed substitution receive the required warranty.

8. The Contractor shall reimburse the Owner any costs for review by the Engineer of proposed product substitutions which require major design changes, as determined by the Owner, to related of adjacent work made necessary by the proposed substitutions.

B. Work-Related Submittals: Contractor's submittal of and the Engineer's acceptance of shop drawings, product data or samples which relate to work not complying with requirements of the Contract Documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

2.03 GENERAL PRODUCT REQUIREMENTS

A. General: Provide products that comply with the requirements of the Contract Documents and that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

1. Standard Products: Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

2. Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date,
either for maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published assurances that the products and its parts are likely to be available to the Owner at a later date.

B. Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

2. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power operated equipment. Locate the nameplate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.

a. Name of manufacturer

b. Name of product

c. Model number

d. Serial number

e. Capacity

f. Speed

g. Ratings

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. General: Except as otherwise indicated in individual sections of these Specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at Time of Acceptance.

END OF SECTION

SECTION 01731 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other Work and subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes upon written instructions of the Engineer.

C. Cutting and patching is performed during the manufacture of products, or during the initial fabrication. Erection or installation processes are not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

D. "Cutting and Patching" includes removal and replacement of Work not conforming to requirements of the Contract Documents, removal and replacement of defective Work, and uncovering Work to provide for installation of ill-timed Work.

E. No Work shall be endangered by cutting or altering Work or any part of it.

1.02 RELATED DOCUMENTS

A. Drawing and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to Work of this Section.

1.03 SUBMITTALS

A. Prior to cutting which affects structural safety of Project, submit written notice to the Engineer, requesting consent to proceed with cutting, including:

1. Identification of Project.

2. Description of affected work.

3. Necessity for cutting.

4. Effect on structural integrity of Project.

5. Description of proposed work. Designate:

a. Scope of cutting and patching.

b. Trades to execute work.

c. Products proposed to be used.

d. Extent of refinishing.

6. Alternatives to cutting and patching.

B. Should conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to the Engineer, including:

1. Conditions indicating change.

2. Recommendations for alternative materials or methods.

3. Submittals as required for Substitutions.

C. Submit written notice to the Engineer, designating time Work will be uncovered, to provide for observation.

1.04 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural Work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio.

B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased energy.

PART 2 - PRODUCTS

2.01 MATERIALS

A. For replacement of work removed, comply with Specifications for type of work to be done.

PART 3 - EXECUTION

3.01 INSPECTION

A. Before cutting, examine the surfaces to be cut and patched and the conditions under which the Work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.

B. After uncovering Work, inspect the condition affecting the installation of products, or performance of the work.

C. Report unsatisfactory or questionable conditions to Engineer in writing, do not proceed with the Work until the Engineer has provided further instructions.

3.02 PREPARATION

A. Temporary Support: To prevent failure, provide temporary support of Work to be cut. Provide shoring, bracing and support as required to maintain structural integrity of project.

B. Protection: Protect other Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching Work. Except as otherwise indicated or as approved by the Engineer, proceed with cutting and patching at the earliest feasible time and complete Work without delay.

B. Cutting: Cut the Work using methods that are least likely to damage work to be retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

2. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.

3. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in wall or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

C. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the Work.

1. Where feasible, inspect and test patched areas to demonstrate integrity of work.

2. Restore exposed finishes of patched areas and where necessary, extend finish restoration into retained adjoining Work in a manner which will eliminate evidence of patching and refinishing.

3. Execute fittings and adjustment of products to provide finished installations to comply with specified tolerances.

4. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.

5. Refinish entire surfaces as necessary to provide an even finish.

   a. Continuous Surfaces: To nearest intersection.

   b. Assembly: Entire refinishing.

3.04 CLEANING

A. Thoroughly clean areas and spaces where Work is performed or used as access to work. Remove completely point, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01740 - CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Maintain premises free from accumulations of waste, debris, and rubbish.

B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces. Leave project clean and ready for occupancy.

1.02 RELATED DOCUMENTS

A. Cutting and Patching: Section 01731.

B. Project Closeout: Section 01770.

C. Cleaning for Specific Products of Work: Specification Section for that work.

1.03 SAFETY REQUIREMENTS

A. Hazards Control:

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

2. Prevent accumulation of wastes which create hazardous conditions.

3. Provide adequate ventilation during use of violative noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on project site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

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

PART 2 - PRODUCTS

2.01 MATERIALS

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

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

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

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

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

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

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

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

F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.02 FINAL CLEANING

A. IT IS OF PARAMOUNT IMPORTANCE THAT THE CONTRACTOR REGARD THIS ITEM WITH THE UTMOST AWARENESS AND CONCERN FOR THE OWNER’S CUSTOMERS. THE CONTRACTOR SHALL PROVIDE ADEQUATE LABOR AND EQUIPMENT TO PERFORM AND ACCOMPLISH THIS CONTINUOUS CLEAN-UP WORK.

B. During the course of the project, the Contractor shall keep the work area tidy and neat. There shall not be any lingering nuisances and/or eyesores, such as mounds of rubbish and dirt, material and equipment spread randomly about, barricaded holes, obstructions and hindrance to pedestrial and/or vehicular traffic, etc.. Weather permitting, driveways and sidewalks shall be promptly replaced in a permanent fashion.

C. Before final acceptance of the work, the Contractor shall satisfactorily clean all areas within the limits of his operations including the street surfaces, walks, gutters, fences, lawns, private property, and structures, leaving them in as neat, clean, and usable condition as originally found. He shall remove all machinery, tools, surplus materials, temporary buildings, and other structures from the site work. He shall also remove all organic matter and materials containing organic matter from all areas an places used by him during construction. All areas shall be cleaned of all sedimentation, debris, rubbish, and dirt.

D. Where the Contractor’s operations have resulted in filling existing ditches, clogging existing culverts, damaging ground surfaces, sidewalks, driveways, etc., the Contractor shall reditch, clean culverts, repair or replace ground surfaces, sidewalks, driveways, etc. so as to return them to a condition as good or better than existed prior to the beginning of his operations.

E. The Contractor's cleanup operations, which include repair, restoration or replacement of ground surfaces and existing improvements and the removal of rock, shall be performed continuously during the construction operations.

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

G. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

H. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior or exterior finished surfaces; polish surfaces so designated to shine finish.

I. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

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

K. Maintain cleaning until project, or portion thereof, is occupied by Owner.

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

END OF SECTION

SECTION 01770 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Liquidated Damages: Supplemental General Conditions

B. Cleaning: Section 01740.

C. Project Record Documents: Section 01785.

1.02 SUBSTANTIAL COMPLETION

A. In order to initiate project closeout procedures, the Contractor shall submit the following:

1. Written certification to Engineer that project is Substantially Complete.

2. List of major items to be completed or corrected.

B. Engineer will make an inspection within seven (7) days after receipt of certification, together with Owner's Representative.

C. Should Engineer consider that work is Substantially Complete:

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

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

a. Date of Substantial Completion.

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

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

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

e. Responsibilities of Owner and Contractor for:

(1) Insurance

(2) Utilities

(3) Operation of Mechanical, Electrical, and Other Systems.

(4) Maintenance and Cleaning.

(5) Security.

f. Signatures of:

(1) Engineer

(2) Contractor

(3) Owner

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

a. Contractor shall:

(1) Obtain certificate of occupancy.

(2) Perform final cleaning in accordance with Section 01740.

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

4. Contractor: Complete work listed for completion or correction, within designated time.

D. Should Engineer consider that work is not Substantially Complete:

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

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

3. Engineer will reinspect work.

E. Should Engineer consider that work is still not finally complete:

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

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

3. Engineer and Owner will reinspect work at Contractor's expense.

1.03 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.

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

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

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

5. Project is completed, and ready for final inspection.

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

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

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

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

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

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: To requirements of Section 01785.

B. Guarantees, Warranties and Bonds: To requirements of particular technical Specifications and Section 01782.

1.05 INSTRUCTION

A. Instruct Owner's personnel in operation of all systems, mechanical, electrical, and other equipment.

1.06 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final applications in accordance with requirements of General Conditions.

1.07 FINAL CERTIFICATE FOR PAYMENT

A. Engineer will issue final certificate in accordance with provisions of general conditions.

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01782 - WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Submit to Engineer for review and transmittal to Owner.

1.02 RELATED DOCUMENTS

A. Bid Bond: Instructions to Bidders.

B. Performance and Payment Bonds: General Conditions and Supplemental General Conditions.

C. Guaranty: General Conditions and Supplemental General Conditions.

D. General Warranty of Construction: General Conditions.

E. Project Closeout: Section 01770.

F. Warranties and Bonds required for specific products: As listed herein.

G. Provisions of Warranties and Bonds, Duration: Respective specification sections for particular products.

1.03 SUBMITTALS REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.

B. Furnish two (2) original signed copies.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product, equipment or work item.

2. Firm name, address and telephone number.

3. Scope

4. Date of beginning of warranty, bond or service and maintenance contract.

5. Duration of warranty, bond or service and maintenance contract.

6. Provide information for Owner's personnel:

   a. Proper procedure in case of failure.

   b. Instances which might affect the validity of warranty or bond.

7. Contractor name, address and telephone number.

1.04 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 in. x 11 in., punch sheets for 3-ring binder.

   a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List:

   a. Title of Project

   b. Name of Contractor

C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.05 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during progress of construction:

1. Submit documents within 10 days after inspection and acceptance.

B. Otherwise make submittals within 10 days after date of substantial completion, prior to final request for payment.

C. For items of work, where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing the date of acceptance as the start of the warranty period.

1.06 SUBMITTALS REQUIRED

A. Submit warranties, bonds, service and maintenance contracts as specified in the respective sections of the Specifications.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01785 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:

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

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

C. Provide files and racks for storage of documents.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

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

1.02 AS-BUILT REQUIREMENTS

A. The Contractor shall, **on a daily basis**, maintain one set of prints of the contract drawings marked to scale indicating the installed size, elevation and location of all equipment, structures, concealed materials including sewer service lines, water service lines, gravity lines, trunk sewer and force mains, water mains, valves, and fire hydrants, as well as other existing utilities affected by the construction or in the trench-width vicinity thereof. All changes made during construction shall be recorded on these prints as they occur. Drawings shall give accurate dimensions to concealed materials from easily discernible permanent points and from right-of-way lines. These marked record prints shall be made readily available at all times to the Owner, the Engineer, and other duly authorized personnel named in these specifications.

B. Final payment will not occur until acceptable As-builts have been submitted to the Engineer.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Shop Drawings, Product Data, and Samples: Section 01340.

1.04 MARKING DEVICES

A. Provide colored pencil or felt-tip marking pen for all marking.

1.05 RECORDING

A. Label each document "PROJECT RECORD" in 2-inch high printed letters.

B. Keep record documents current.

C. Do not permanently conceal any work until required information has been recorded.

D. Contract Drawings: Legibly mark to record actual construction:

1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

3. Field changes of dimension and detail.

4. Changes made by Change Order or Field Order.

5. Details not on original Contract Drawings.

E. Specifications and Addenda: Legibly mark up each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Change Order or Field Order.

3. Other matters not originally specified.

F. Shop Drawings: Maintain as record documents; legibly annotate shop drawings to record changes made after review.

1.06 SUBMITTALS

A. At completion of project, deliver record documents to Engineer.

B. Accompany submittal with transmittal letter, in duplicate, containing:

1. Date.

2. Project Title and Number.

3. Contractor's Name and Address.

4. Title and Number of each Record Document.

5. Certification that each Document as Submitted is Complete and Accurate.

6. Signature of Contractor, or His Authorized Representative.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02220 - DEMOLITION & SALVAGE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required for demolition as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02300

1.03 PROCEDURE

A. The procedures proposed for the accomplishment of salvage and demolition work shall be submitted for review. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

B. It is the responsibility of the Contractor to visit the site to familiarize himself with the amount of Work that is included under this Section.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 DUST CONTROL

A. The amount of dust resulting from the demolition shall be controlled to prevent the spread of dust to occupied portions of the plant and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

3.02 DISCONNECTION OF UTILITY SERVICES

A. Utilities shall be disconnected at the points indicated by the Owner or Engineer and left in a safe condition.

3.03 BURNING

A. The use of burning at the project site for the disposal of refuse and debris will not be permitted, unless authorized in writing by the Owner.

3.04 PROTECTION OF EXISTING WORK

A. Existing work to remain shall be protected from damage. Work damaged by the Contractor shall be repaired to match existing work.

3.05 BACKFILL OF STRUCTURES

A. The portion of the demolished structures remaining below grade (where noted on Drawings or approved by the Engineer) shall be backfilled with concrete, stone, etc., from the demolition or any backfill material which is acceptable to the Engineer. The top two (2) feet of the backfill shall be made up of topsoil and graded to match the existing ground. It shall be free of any of the demolition material. The entire backfill shall be compacted in such a manner as to prevent settlement.

B. It is the responsibility of the Contractor to dispose of all excess demolition material from the site as soon as practicable.

3.06 REMOVAL OF MANHOLES

A. Where note on Drawings or referenced in Specifications, manholes shall be completely removed from the Project. Contractor shall be responsible for the excavation, removal, haul away, disposal of the manhole, as well as backfill (flowable fill where required) and surfaces restoration.

3.07 SALVAGE MATERIAL

A. All equipment, pumps, controls, valves, piping, etc., is the property of the Owner and care shall be taken in its removal so not to damage it in any way. Such salvage material shall be removed and delivered to the Owner to a site designated by him. The Owner has the right to refuse any salvage material, and in such cases it is the responsibility of the Contractor to dispose of the unwanted material.

END OF SECTION

SECTION 02240 - DEWATERING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor and equipment required to dewater all excavations.

B. Dewatering of all excavations shall be the responsibility of the Contractor, and no additional compensation will be allowed for same unless specifically included as a bid item.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork is included in Section 02300.

B. Erosion and sedimentation control is included in Section 02371.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GENERAL

A. Dewatering equipment shall be of adequate size and quantity to assure maintaining proper conditions for installing pipe, concrete, backfill or other material or structure in the excavation.

B. Dewatering shall include proper removal of any and all liquid, regardless of its source, from the excavation and the use of all practical means available to prevent surface runoff from entering any excavation.

C. The site shall be kept free of surface water at all times. The Contractor shall install drainage ditches, dikes and shall perform all pumping and other work necessary to divert or remove rainfall and all other accumulations of surface water from the excavations. The diversion and removal of surface water shall be performed in a manner that will prevent flooding and/or damage to other locations within the construction area where it may be detrimental. The Contractor shall provide, install and operate sufficient trenches, sumps, pumps, hose piping, well points, deep wells, etc., necessary to depress and maintain the ground water level at least two (2) feet below the base of the excavation during all stages of construction operations. The ground water table shall be lowered in advance of excavation and maintained a minimum of two (2) feet below the lowest excavation subgrade made until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural ground water.

D. No liquid from the excavated area shall be discharged into the sanitary sewer system.

END OF SECTION

SECTION 02260 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section includes, but is not limited to, the following:

1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.

2. Maintenance of shoring and bracing.

3. Removal of shoring and bracing, as required.

B. Types of shoring and bracing systems include, but are not limited to, the following:

1. Steel H-section (soldier) piles.

2. Timber lagging.

3. Steel sheet piles.

4. Portable Steel Trench Box.

C. Building excavation is specified in another Division 2 Section.

1.02 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Section 01340.

B. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer. System design and calculations must be acceptable to local authorities having jurisdiction.

1.04 QUALITY ASSURANCE

A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located, and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.

B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer foundation consultant.

1. Submit name of engaged consultant and qualifying technical experience.

C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.05 JOB CONDITIONS

A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

B. Survey adjacent structures and improvements, employing qualified professional engineer, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

C. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident.

1.06 EXISTING UTILITIES

A. Protect existing active sewer, water, gas, electricity and other utility services and structures.

B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal, and discontinuing of services.

C. The Contractor shall be solely responsible for locating the existing utilities, verifying their size and elevation, protecting them during construction, repairing as needed or temporary relocating or supporting when required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.

B. Structural Steel: ASTM A 36.

C. Steel Sheet Piles: ASTM A 328.

D. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.

E. Portable Steel Trench Box shall be OSHA approved.

PART 3 - EXECUTION

3.01 SHORING

A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.

B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.02 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Engineer.

C. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

D. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

E. Remove sheeting, shoring, and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.

F. Repair or replace, as acceptable to Engineer, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all materials, labor, equipment and services necessary to do all clearing and grubbing, excavation, backfilling, providing of additional fill material and topsoil, control of surface drainage and ground water, finished site grading and erosion control required to construct the work as shown.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. State and local code requirements shall control the disposal of trees and shrubs.

B. All burning shall be controlled by applicable local regulations.

1.03 JOB CONDITIONS

A. Weather: Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained on account of rain, snow, ice, drought or other adverse weather conditions.

B. Existing Utilities: Prior to commencement of work, the Contractor shall locate existing underground utilities in areas of the work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. Use of Explosives: The Contractor (or any of his Subcontractors) shall not bring explosives onto site or use in work without prior written permission from the Owner. All activities involving explosives shall be in compliance with the rules and regulations of the State Department of Mines, and Minerals, Division of Explosives and Blasting. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

D. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights.

    a. Operate warning lights as recommended by authorities having jurisdiction.

    b. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

E. Dust Control: Use all means necessary to control dust on or near the project site where such dust is caused by the Contractor's operations or directly results from conditions left by the Contractor.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Definitions:

1. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, SP, GC, SC, ML, and CL.

2. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups MH, CH, OL, OH and PT. The Contractor shall notify the Engineer if these soil materials are encountered.

3. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

4. Drainage Fill: Washed, evenly graded mixture of crushed stone, or uncrushed gravel, with 100 percent passing a 1 - ½ inch sieve and not more than 5 percent passing a no. 4 sieve.

5. Backfill and Fill Materials: Satisfactory soil materials free of debris, waste, frozen materials, vegetable, and other deleterious matter.

2.02 DENSE GRADED AGGREGATE D.G.A.

A. Dense graded aggregate shall consist of crushed stone or crushed slag in combination with approved mineral filler needed to meet grading requirements. The D.G.A. shall comply with the applicable requirements of Section 805 of the Kentucky Department of Transportation's Standard Specifications for Road and Bridge Construction, 2000.

2.03 PIPE BEDDING & BACKFILL

A. Pipe Bedding: Pipe bedding material shall consist of crushed stone and shall conform to grading limits for No. 9 crushed stone as specified in Section 805 of the Kentucky Department of Transportation's Standard Specifications for Road and Bridge Construction, 2000.

B. Crushed Stone Backfill: Crushed stone for backfilling in paved areas (not in the State's right-of-way) and areas within the State's right-of-way, but not beneath existing pavement shall be No. 9 as specified in the Kentucky Department of Transportation's Standard Specifications for Road and Bridge Construction, 2000. If in rock cut or unsuitable backfill may backfill with No. 57 or 67 stone. Backfill shall be compacted in six (6) inch layers or lifts.

C. Flowable Fill Backfill: Flowable fill shall be used as backfill material in accordance with the standard detail drawings for pipe main lines and services under existing State roadways. Flowable fill shall conform to Subsection 601.03.03B of Kentucky Transportation Cabinet's Standard Specifications for Road and Bridge Construction, 2000 edition.

D. Geotextile Fabric Material (For Crushed Stone Backfill): Contractor shall use Type IV fabric with a minimum width of 36 inches conforming to Section 843 of Kentucky

Transportation Cabinet's Standard Specifications for Road and Bridge Construction, 2000 edition. All pipes within the State's right-of-way (not backfilled with flowable fill as specified herein) should be backfilled as noted and wrapped with geotextile fabric. See item B of this Section 2.03.

PART 3 - EXECUTION

3.01 CLEARING AND GRUBBING

A. Work shall consist of cutting and removing designated trees, stumps, brush, logs, removal of fences, or other loose and projecting material. Unless otherwise specified, it shall also include the grubbing of stumps, roots, and other natural obstructions which, in the opinion of the Engineer, must be removed to execute properly the construction work and operate properly the facility upon the completion of construction.

B. Trees, bushes, and all natural vegetation shall only be removed with the approval of the Engineer. No cleared or grubbed materials shall be used in backfills or embankment fills. All stumps, roots, and other objectionable material shall be grubbed up so that no roots larger than 3 inches in diameter remain less than 18 inches below the ground surface. All holes and depressions left by grubbing operations shall be filled with suitable material and compacted to grade, as recommended in Paragraph 3.06.

C. Disposal shall be by burning or other methods satisfactory to the Engineer; however, burning will be permitted only when the Contractor has obtained written permission from the local regulatory agency.

D. The Contractor shall also remove from the site and satisfactorily dispose of all miscellaneous rubbish including, but not limited to, masonry, scrap metal, rock, pavement, etc., that is under the fill or to be removed as shown on the Drawings, specified herein, or directed by the Engineer.

E. Existing improvements, adjacent property, utility and other facilities, and trees, plants, and brush that are not to be removed shall be protected from injury or damage resulting from the Contractor's operations.

F. Trees and shrubs, designated to remain or that are beyond the clearing and grubbing limit, which are injured or damaged during construction operations shall be treated or replaced at the Contractor's expense by experienced tree surgery personnel.

3.02 EROSION CONTROL

A. Temporary measures shall be applied throughout the construction period to control and to minimize siltation to adjacent properties and waterways. Such measures shall include, but not be limited to, the use of berms, baled straw silt barriers, gravel or crushed stone, mulch, slope drains and other methods.

B. These temporary measures shall be applied to erodible material exposed by any activity associated with the construction of this project.

C. Refer to Section 02371, Erosion and Sedimentation Control for requirements.

3.03 EXCAVATION

A. Excavation of every description and of whatever substances encountered within the grading limits of the project shall be performed to the lines and grades indicated on the Drawings. All excavation shall be performed in the manner and sequence as required for the work.

B. All excavated materials that meet the requirements for fill, subgrades or backfill shall be stockpiled within the site for use as fill or backfill, or for providing the final site grades. Where practicable, suitable excavated material shall be transported directly to any place in the fill areas within the limits of the work. All excavated materials that are not suitable for fill, and any surplus of excavated material that is not required for fill shall be disposed of by the Contractor.

C. The site shall be kept free of surface water at all times. The Contractor shall install drainage ditches, dikes and shall perform all pumping and other work necessary to divert or remove rainfall and all other accumulations of surface water from the excavations. The diversion and removal of surface water shall be performed in a manner that will prevent flooding and/or damage to other locations within the construction area where it may be detrimental. The Contractor shall provide, install and operate sufficient trenches, sumps, pumps, hose piping, well points, deep wells, etc., necessary to depress and maintain the ground water level at least two (2) feet below the base of the excavation during all stages of construction operations. The ground water table shall be lowered in advance of excavation and maintained a minimum of two (2) feet below the lowest excavation subgrade made until the excavation is backfilled or the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural ground water.

D. Excavations for concrete structural slabs and footings on grade shall extend two (2) feet below the indicated bottom of slabs and footings. The over-excavation shall be backfilled with 18 inches, compacted thickness, of over lot fill material or suitable material as herein specified. The remaining six (6) inches of over-excavation shall be backfilled with porous fill material. The porous fill layer shall extend beyond the limits of the concrete slab a minimum of two (2) feet on all sides as indicated on the Drawings. The porous fill shall be crushed stone or gravel and shall have the following U.S. Standard Sieve gradation:

Sieve	1-1/2	1	3/4	1/2	3/8
% Passing	Min 100	95±5	58±17	Max 15	Max 5

E. Excavations for the construction shall be carefully made to the depths required. Bottoms for footings and grade beams shall be level, clean and clear of loose material, the lower sections true to size. Bottoms of footings and grade beams, in all locations, shall be at a minimum depth of 30 inches below adjacent exterior finished grade or 30 inches below adjacent existing grade, whichever is lower, whether so indicated or not. Footings and grade beam bottoms shall be inspected by the Engineer before any concrete is placed thereon.

F. In excavations for structures where, in the opinion of the Engineer, the ground is spongy or otherwise unsuitable for the contemplated foundation, the Contractor shall remove such unsuitable material and replace it with suitable material properly compacted.

G. Sheeting and shoring shall be provided as necessary for the protection of the work and for the safety of the personnel. The clearances and types of the temporary structures, insofar as they affect the character of the finished work, will be subject to the review of the

Engineer, but the Contractor shall be responsible for the adequacy of all sheeting, bracing and cofferdamming. All shoring, bracing and sheeting shall be removed as the excavations are backfilled in a manner such as to prevent injurious caving; or, if so directed by the Engineer, shall be left in place. Sheeting left in place shall be cut off 18 inches below the surface.

H. Excavation for structures which have been carried below the depths indicated without specific instructions shall be refilled to the proper grade with suitable material properly compacted, except that in excavation for columns, walls or footings, the concrete footings shall extend to this lower depth. All work of this nature shall be at the Contractor's expense.

3.04 FILL

A. All existing fill below structures and paved areas must be stripped. The upper six (6) inches of the natural subgrade below shall be scarified and recompacted at optimum moisture to at least ninety-five percent (95%) of Standard Proctor Density ASTM D 698 (latest revision).

B. All vegetation, such as roots, brush, heavy sods, heavy growth of grass and all decayed vegetable matter, rubbish and other unsuitable material within the area upon which fill is to be placed shall be stripped or otherwise removed before the fill is started. In no case will such objectionable material be allowed to remain in or under the fill area. Existing fill from excavated areas on site shall be used as fill for open and/or planted areas. Additional fill stockpiled at the site can be used for structural fill if approved by the Engineer. Any additional material necessary for establishing the indicated grades shall be furnished by the Contractor and approved by the Engineer. All fill material shall be free from trash, roots and other organic material. The best material to be used in fills shall be reserved for backfilling pipelines and for finishing and dressing the surface. Material larger than 3 inches maximum dimension shall not be permitted in the upper 6 inches of the fill area. Fill material shall be placed in successive layers and thoroughly tamped or rolled in a manner approved by the Engineer, each layer being moistened or dried such that the specified degree of compaction shall be obtained. No fill shall be placed or compacted in a frozen condition or on top of frozen material. No fill material shall be placed when free water is standing on the surface of the area where the fill is to be placed and no compaction of fill will be permitted with free water on any point of the surface of the fill to be compacted.

C. Where concrete slabs are placed on earth, all loam and organic or other unsuitable material shall be removed. Where fill is required to raise the subgrade for concrete slabs to the elevations as indicated on the Drawings or as required by the Engineer, such fill shall consist of suitable material and shall be placed in layers. Each layer shall be moistened or dried such that the specified degree of compaction shall be obtained. All compaction shall be accomplished in a manner and with equipment as approved by the Engineer. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for adjacent fill.

3.05 BACKFILLING - GENERAL

A. After completion of footings, grade beams and other construction below the elevation of the final grades and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall be as specified for

suitable material, placed and compacted as specified hereinafter. Backfill shall be placed in horizontal layers of the thickness specified and shall have a moisture content such that the required degree of compaction is obtained. Each layer shall be compacted by mechanical tampers or by other suitable equipment approved by the Engineer to the specified density. Special care shall be taken to prevent wedging action or eccentric loading upon or against the structure. Trucks and machinery used for grading shall not be allowed within 45 degrees above the bottom of the footings or grade beams.

B. The trenches shall be backfilled following visual inspection by the Engineer and prior to pressure testing. The trenches shall be carefully backfilled with the materials approved for backfilling as specified and/or shown on the Drawings.

C. Pipe Bedding: In all cases the foundation for pipes shall be prepared to that the entire load of the backfill on top of the pipe will be carried on the barrel of the pipe and insofar as possible where bell and spigot pipe are involved so that none of the load will be carried on the bells.

D. The depth at the bottom of the bells of the pipe will be at least four inches above the bottom of the trench as excavated.

E. Supporting of pipe shall be as set out hereinbefore, and in no case shall the supporting of pipe on blocks be permitted.

1. Earth Foundations: All water and sewer main and service pipe shall be supported on a bed of Size Number 9 crushed stone as defined by the Kentucky Department of Highways Specifications and as shown on the Detail Sheets. Bedding material shall be free from rock and be acceptable to the Engineer. In no case shall pipe be supported directly on rock.

2. Rock Foundation: If the trench bottom is in rock, the excavation shall be undercut to a minimum depth of six inches below the bottom of the pipe. The pipe shall be laid on a bed of granular material to provide continuous support for the lower section of the pipe. Granular bedding shall be Number 9 crushed stone as shown on the Detail Sheets.

3. Special Bedding: In wet, yielding murky locations, where pipe is in danger of sinking below grade or floating out of line or grade, or where backfill materials are of such a fluid nature that such movements of the 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. When ordered by the Engineer, yielding and murky material in subgrades shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe. Crushed stone or other granular material, if necessary, as determined by the Engineer to replace poor subgrade material, shall be classified as “Special Pipe Bedding”. Granular material for “Special Pipe Bedding” shall be Number 57 or 67 as directed by the Engineer.

F. Backfill in Open Terrain (Outside the State’s Right-of-Way, Outside of the Railway’s Right-of-Way and not Beneath Pavement): In all installations, the lower portion of the trench, from the pipe bedding to the springline (centerline) of the pipe shall be backfilled with No. 9 crushed stone.

1. Ductile Iron Pipe: When installing ductile iron pipe, the portion of the trench from the springline of the pipe to a point twelve (12) inches above the pipe shall be backfilled with No. 9 crushed stone. The upper portion of the trench shall be

backfilled with selected native backfill material. Backfilling this portion of the trench is to be accomplished by any means approved by the Engineer.

2. Polyvinyl Chloride Sewer Pipe: When installing P.V.C. sewer pipe, the portion of the trench from the springline of the pipe to a point twelve (12) inches above the pipe shall be backfilled with Number 9 crushed stone. The upper portion of the trench above the crushed stone shall be backfilled with selected native backfill material. Backfilling this portion of the trench is to be accomplished by any means approved by the Engineer.

G. Backfill Under Paved Area: See Paragraph 2.03 of this section for information regarding the various backfill requirements under paved areas.

3.06 COMPACTION

A. In all cases, walking or working on the completed pipelines except as may be necessary in tamping or backfilling will not be permitted until the trench has been backfilled to point one foot above the top of the pipe. The filling of the trench and the tamping of the backfill shall be carried on simultaneously on both sides of the pipe in such a manner that the completed pipelines will not be disturbed and injurious side pressures do not occur. When directed by the Engineer, the Contractor shall add water to the backfill material or dry out the material when needed to attain a condition near optimum moisture content for a maximum density of the material when it is tamped. The Contractor shall obtain a compaction of the backfill of at least 95 percent of modified proctor density (ASTM D-1557) where mechanical tamping of backfill is required or allowed. Before final acceptance, the Contractor will be required to level off all trenches or to bring the trench up to the level of the surrounding terrain.

B. When placing backfill around structures, it shall be placed in maximum of six-inch (6) lifts and each lift thoroughly compacted to the specified density. Care shall be taken not to damage the structure by increased earth loads or other damages as may occur due to the backfilling operations. Care shall also be taken so as not to damage the structure's waterproofing (if so applied). If damages shall occur, backfilling operations shall be ceased and the damage shall be repaired to the complete satisfaction of the original design intent and of the Engineer.

C. If a Soil's Consultant's report was prepared for the Project, then the complete recommendations shall be followed in the placement and compaction of the backfill material.

D. The granular backfill material is elected to be used by the Contractor or is specified elsewhere, it too shall be so placed so as to avoid damage the structure by increased earth loads or other damages as may occur due to the backfilling operations. Care shall also be taken so as not to damage the structure's waterproofing (if so applied). If damages shall occur, backfilling operations shall be ceased and the damage shall be repaired to the complete satisfaction of the original design intent and of the Engineer.

3.07 SITE GRADING

A. Where indicated or directed, topsoil shall be removed without contamination with subsoil and spread on areas already graded and prepared for topsoil, or transported and stockpiled convenient to areas for later application, or at locations specified. Topsoil shall be

stripped to full depth and, when stored, shall be kept separate from other excavated materials and piled free of roots, stones, and other undesirable materials.

B. Following stripping, fill areas shall be scarified to a minimum depth of six (6) inches to provide bond between existing ground and the fill material. Material should be placed in successive horizontal layers not exceeding twelve (12) inches uncompacted thickness. In general, layers shall be placed approximately parallel to the finished grade line.

C. In general and unless otherwise specified, the Contractor may use any type of earth moving equipment he has at his disposal, provided such equipment is in satisfactory condition and of such type and capacity that the work may be accomplished properly and the grading schedule maintained. During construction, the Contractor shall route equipment at all times, both when loaded and empty, over the layers as they are placed, and shall distribute the travel evenly over the entire area.

D. The material in the layers shall be of the proper moisture content before rolling or tamping to obtain the prescribed compaction. Wetting or drying throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on the fill thus affected shall be delayed until the material has dried to the required moisture content. If the material is too dry, it shall be sprinkled with water and manipulated to obtain the uniform moisture content required throughout a layer before it is compacted.

E. Each layer of the fill shall be compacted by rolling or tamping to the standard specified in Paragraph 3.06 and not less than 90% maximum density at optimum moisture content as determined by field density tests made by the Standard Proctor method in accordance with ASTM D 698. In general and unless otherwise specified, the Contractor may use any type of compaction equipment such as sheepsfoot rollers, pneumatic rollers, smooth rollers and other such equipment he has at his disposal, provided such equipment is in satisfactory condition and is of such design, type, size, weight, and quantity to obtain the required density in the embankment. If at any time the required density is not being obtained with the equipment then in use by the Contractor, the Engineer may require that different and/or additional compaction equipment be obtained and placed in use at once to obtain the required compaction.

F. Samples of all fill and embankment materials, both before and after placement and compaction, will be taken by the Engineer, and from the tests made on such samples, certain corrections, adjustments, and modifications of methods, materials, and moisture content will be directed to obtain uniformity with the governing specifications for compaction and construct properly the fill and embankment.

G. The Contractor shall be responsible for the stability of all embankments and shall replace any portion which, in the opinion of the Engineer, has become displaced due to carelessness or negligence on the part of the Contractor.

3.08 TOPSOIL

A. Provide all labor, materials, equipment and services required for furnishing and placing topsoil. Samples of topsoil shall be submitted to the Engineer for review before topsoil is placed. The material shall be good quality loam and shall be fertile, friable, mellow; free from stones larger than one (1) inch, excessive gravel, junk metal, glass, wood, plastic articles, roots and shall have a liberal amount of organic matter. Light sand loam or heavy clay loam will not be acceptable.

B. The topsoil shall be 3 inches thick in all areas to be seeded. No topsoil shall be placed until the area to be covered is excavated or filled to the required grade. Imported backfill material will be stockpiled on site for structure backfilling and topsoiling.

END OF SECTION

SECTION 02371 - EROSION AND SEDIMENTATION CONTROL-KPDES REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment required for erecting, maintaining and removing temporary erosion and sedimentation controls as shown on the Drawings and as specified herein and as recommended by state and local regulatory agencies.

B. The contractor shall at all times minimize disturbance and the period of time that the disturbed area is exposed without stabilization practices. In "critical areas" (within 25 feet of a stream) erosion prevention measures such as erosion control mats/blankets, mulch, or straw blown in and stabilized with tackifiers or by treading, etc shall be implemented on disturbed areas within 24 hours or "as soon as practical" after completion of disturbance/grading or following cessation of activities.

C. Temporary erosion controls include, but are not limited to grassing, mulching, seeding, providing erosion control and turf reinforcement mats on all disturbed surfaces including waste area surfaces and stockpile and borrow area surfaces; scheduling work to minimize erosion and providing interceptor ditches at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits.

D. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances on sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits.

E. Contractor is responsible for providing and maintaining effective temporary erosion and sediment control measures prior to and during construction or until final controls become effective.

F. The Contractor shall be responsible for placement of erosion and sedimentation controls. Prior to construction, the Contractor shall develop a Stormwater Pollution Prevention Plan per state regulations. Prior to excavation, fill or grade work, the Contractor shall place controls in locations required by the plan. If during the course of construction, the state and/or local regulatory agency determines additional controls are required, the Contractor shall furnish, install and maintain additional mulching, blankets and/or sediment barriers to control erosion and sedimentation to the satisfaction of the regulatory agency.

G. The Contractor shall inspect and repair all erosion and sedimentation controls every seven (7) days and after each rainfall of 0.5 inch or greater.

H. Bare soil areas must be seeded, mulched, or covered after 14 days if no work will be done in the area within the next 7 days. **If areas are to be left bare for more than 14 days, erosion controls and sediment barriers are required to be installed.**

I. **Erosion Control prevention measures shall be installed prior to removal of vegetation and/or stripping of topsoil.**

J. The Contractor is responsible for preparing and submitting the Notice of Intent and attachments and obtaining permit approval prior to the beginning of any construction activities.

1.02 PERMIT AND NOTIFICATION REQUIREMENTS

A. The Contractor shall submit a Notice of Intent Specifically for Construction Activities (NOI-SWCA) before beginning any site disturbance, and shall implement erosion control measures as may be required by state, local and federal agencies. Contractor shall submit a signed Notice of Intent form and required attachments to the Division of Water at least seven (7) days, if an electronic submittal or thirty (30) days if a written submittal, prior to beginning of construction activity. See Paragraph 3.07 in this section for detailed requirements.

B. The Contractor shall comply with all additional requirements of the local regulatory agency.

1.03 RELATED WORK

A. Dewatering is included in this Division, Section 02240.

B. Final erosion protection measures where required are included in this Section.

C. Utility Line Stream Crossings – Division 2.

PART 2 – PRODUCTS

2.01 SEED

A. The seed mixture to be sown shall be in the following proportions:

Common Name	Proportion By Weight	% of Purity	% of Germination
Kentucky 31 Tall Fescue	75	90	85
Italian Rye Grass	10	90	85
Red Top	10	90	85
White Clover	5	95	90

B. All seed shall be fresh and clean and shall be delivered mixed, in unopened packages, bearing a guaranteed analysis of the seed mixture.

C. Seed for temporary stabilization shall be annual rye grass, oats or wheat.

2.02 FERTILIZER

A. Just prior to the planting of turf, evenly broadcast 15 pounds per thousand square feet of fertilizer, 10-10-10 (nitrogen, phosphorus, potassium). Disc or harrow fertilizer 2 to 4 inches into the soil.

B. Fertilizer shall be delivered to the site in the original unopened container bearing the manufacturer's guarantee analysis. Any fertilizer that becomes caked or damaged making it unsuitable for use, will not be accepted.

2.03 SOD

A. Sod shall be at least 70% Bluegrass, strongly rooted and free of weeds.

B. It shall be mowed to a height not to exceed 3" before lifting, and shall be of uniform thickness with ½" to 1- ½" of soil.

2.04 MULCH

A. Mulch for seeded areas shall be Conwed Hydro Mulch, Silva-Fiber, or equal. It shall be suitable for use in a water slurry or for application with hydraulic equipment. The moisture content shall be 9-15%, and mulch shall have an organic matter content of minimum 98%.

B. Clean straw is acceptable as mulch. It shall be spread at the rate of one (1) bale per 1,000 feet (approximately 2" loose depth).

C. Mulch on slopes greater the 4:1 shall be held in place with erosion control netting.

D. Mulch on areas subject to surface water run-off or in drainage ditches shall be held in place with erosion control netting.

2.05 EROSION CONTROL BLANKETS

A. Erosion Control Blanket shall be made up of biodegradable and/or photodegradable products such as jute, wood fiber, coconut fiber, straw and degradable plastic netting. They shall degrade at a rate of approximately 6 months to 24 months.

B. Erosion Control Blanket shall be installed on slopes greater than 4:1 and in all ditches and drainage channels, and where otherwise indicated on the Contract Drawings or directed by regulatory agencies.

2.06 TURF REINFORCEMENT MAT

A. Where indicated on the Contract Drawings or as described in the Specifications, Turf Reinforcement Mat shall be installed for permanent erosion control.

B. Turf Reinforcement Mat shall consist of top and bottom heavy weight netting and biodegradable matrix such as coconut fiber or aspen curled wood excelsior.

C. Where slope and hydraulic conditions are severe, a synthetic matrix may be used, based on manufacturer's recommendations.

2.07 SILT FENCE

A. Temporary Silt Fence shall consist of woven geotextile fabric attached to 2" X 2" X 48" tall hardwood stakes.

1. Fabric shall be 48” tall, with top being even with top of stakes. Bottom 12” shall be buried in trench as shown on the Detail Drawings.

2. Stakes shall be at 6’ centers unless stated otherwise on Contract Documents.

B. Temporary Reinforced Silt Fence

1. For areas of steep slopes and high flows, where indicated on the Contract Drawings, or as directed by state or local regulations, Reinforced Silt Fence shall be installed.

2. Fabric shall be woven monofilament geotextile attached to 11 gauge steel fencing of 2” X 4” grid.

3. Stakes shall be 5” tall steel and shall be installed on 4’ centers.

4. Fabric and fencing shall be buried in trench as shown on the Detail Drawings.

C. Spacing of Silt Fences on slopes shall be according to the following table, or as directed by state or local regulatory agencies:

		Soil Type	
Slope Angle	Silty	Clays	Sandy
Very Steep (1:1)	50 ft.	75 ft.	100 ft.
Steep (2:1)	75 ft.	100 ft.	125 ft.
Moderate (4:1)	100 ft.	125 ft.	150 ft.
Slight (10:1)	125 ft.	150 ft.	200 ft.

D. If runoff flows along the uphill side of the silt fence, Contractor shall install “J-hooks” every 40 to 80 feet. These are curved sections of silt fence above the continuous fence that serve as small dams to stop and hold the flow to allow sediment to settle.

2.08 FIBER ROLLS

A. On long slopes less than 10:1, and where indicated on the Contract Drawings or recommended by the regulatory agency, Fiber Rolls shall be installed.

B. Fiber Rolls shall be made of wood shavings, coconut fiber or other similar material encased in heavy duty netting.

C. Wooden stakes at 4’-0” on center shall be used to anchor the Fiber Rolls along the contours of the slope.

2.09 AGGREGATE SILT CHECKS

A. Where needed to slow flow velocity, to cause ponding or to protect storm water inlet structures, Aggregate Silt Checks shall be installed.

B. Aggregate Silt Checks shall consist of rock of various sizes ranging from 2” to 6” contained in or placed on geotextile filter fabric. Pea-stone or gravel-filled bags are acceptable for temporary silt checks in low-flow conditions.

2.10 RIP RAP

A. Rip Rap shall be installed at the outlets of storm drains and on channel banks as noted on the Contract Drawings and/or recommended by state and local regulatory agencies.

B. Rip Rap shall have no less than 80%, by volume, of individual stones that range in size from 0.0247 to 1.483 cubic feet.

2.11 CONSTRUCTION ENTRANCE PAD

A. Contractor shall construct entrance pads at all locations where vehicles will enter or exit the site.

B. Pad shall be a minimum of 20 feet wide, 50 feet long and 6" thick, and consist of No. 2 stone laid on top of filter fabric.

PART 3 - EXECUTION

3.01 GENERAL

A. Erosion and sediment control practices shall be consistent with the requirements of the state and local regulatory agencies and in any case shall be adequate to prevent erosion of disturbed and/or regraded areas.

B. Contractor is responsible for notifying the state regulatory agency concerning inclusion under the KPDES General Permit for Storm Water Discharges From Construction Activities.

C. Gravity sewer lines, force mains and water lines that cross steams shall be constructed by methods that maintain normal stream flow and allow for a dry excavation. Water pumped from the excavation shall be contained and allowed to settle prior to reentering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the line excavation shall not be allowed to enter the flowing portion of the stream. The provisions of this condition shall apply to all types of utility line stream crossings.

D. Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access. Effective erosion and sedimentation control measures must be employed at all times during the project to prevent degradation of waters of the Commonwealth. Site regrading and reseeding will be accomplished with 14 days after disturbance.

3.02 TEMPORARY AND PERMANENT STABILIZATION REQUIREMENTS

A. Temporary Stabilization is required for all disturbed areas where active work is not being performed. Rough graded areas and topsoil piles that are not in active use must be seeded immediately. The Contractor shall follow the guidelines in the table below:

Temporary Stabilization Table

Area Requiring Temporary Stabilization	Time Frame to Apply Erosion Controls
Any disturbed areas within 25 feet of a stream	Within 24 hours of the most recent disturbance if the area will remain idle for more than 21 days
For all construction activities, any disturbed areas that will be dormant for more than 21 days but less than one year, and not within 25 feet of a stream	Within seven days of the most recent disturbance within the area
Disturbed areas that will be idle over winter	Prior to the onset of winter weather
All areas where activity has temporarily ceased	Within 14 days

B. Permanent control measures to minimize erosion and sedimentation shall be through the stabilization of soil as soon as possible with perennial vegetation. The contractor shall follow the guidelines for Permanent Stabilization as specified in the table below.

Permanent Stabilization Table

Area Requiring Permanent Stabilization	Time Frame to Apply Erosion Controls
Any areas that will lie dormant for 180 days or more	Within 14 days of the most recent disturbance
Any areas within 25 feet of a stream and at final grade	Within 24 hours of reaching final grade
Any other areas at final grade	Within 7days of reaching final grade within that area

If permanent seeding is not practical due to the time of year, the disturbed area shall be seeded immediately with an annual rye grass at a rate of 3 lb. per 1,000 sq. feet and mulched with straw at a rate of 2.5 tons per acre. Mulch shall be anchored at 6 to 12-inch intervals across the slope by crimping into soil.

3.03 SEEDING

A. The areas to be seeded shall be thoroughly tilled to a depth of at least 4" by discing, harrowing, or other approved methods until the condition of the soil is acceptable to the Engineer. After harrowing or discing, the seed bed shall be dragged and/or hand raked to finish grade.

B. The incorporation of the fertilizer and the agricultural lime may be a part of the tillage operation and shall be applied no less than 24 hours nor more than 48 hours before the seed is to be sown.

C. Seed shall be broadcast either by hand or approved sowing equipment at the rate of ninety (90) pounds per acre (two pounds per 1,000 square feet), uniformly distributed over the area. Broadcasting seeding during high winds will not be permitted. The seed shall be drilled or raked into a depth of approximately ½ inch and the seeded areas shall be lightly raked to cover the seed and rolled. Drilling seeding shall be done with approved equipment with drills not more than 3 inches apart. All ridges shall be smoothed out, and all furrows and wheel tracks likely to develop into washes, shall be removed.

D. After the seed has been sown, the areas so seeded shall be mulched with clean straw at the rate of one (1) bale per 1,000 feet (approximately 2 inch loose depth). Mulch on slopes and in all ditches and drainage channels shall be held in place with erosion control blankets.

E. Areas seeded shall be watered and protected until a uniform stand develops, and then inspected periodically and maintained appropriately. Displaced mulch shall be replaced or any damage to the seeded area shall be repaired promptly, both in a manner to cause minimum disturbance to the existing stand of grass. If necessary to obtain a uniform stand, the Contractor shall refertilize, reseed and remulch as needed. Scattered bare spots up to one (1) square yard in size will be allowed up to a maximum of 10 percent of any area.

F. The following table is a guide to schedule seeding and mulching:

Stabilization Practice	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JULY**	**AUG**	**SEPT**	**OCT**	**NOV**	**DEC**
Permanent Seeding			A									
Dormant Seeding	B										B	
Temporary Seeding			G	E				D				
Sodding			F									
Mulching	G											

Seed and Mulch:

A = Fescue, Clover, Ryegrass Mixture:	160 lbs/acres or 4 lbs/1,000 s.f. plus 2 tons mulch per acre
B = Fescue, Clover, Ryegrass Mixture:	160 lbs/acres or 4 lbs/1,000 s.f. plus 2 tons mulch per acre
C= Oats:	120 lbs/acre
D=Wheat or Rye:	120 lbs/acre
E=Perennial Ryegrass:	40 lbs/acre or 1 lb/1,000 s.f.
F=Install Sod	
G= Mulch	2 tons per acre
Irrigation Needed:	May through August and October and two to three weeks after installing sod in March or April

3.04 SOD

A. To install, bring soil to final grade and clear of trash, wood, rock, and other debris. Apply topsoil, fertilizer at approximately 1000 lbs per acre.

B. Use sod within 36 hours of cutting. Lay sod in straight lines. Butt joints tightly, but do not overlap joints or stretch sod. Stagger joints in adjacent rows in a brickwork type pattern. Use torn or uneven pieces on the end of the row.

C. Notch into existing grass. Anchor sod with pins or stakes if placed on slopes greater than 3:1. Roll or tamp sod after installation and water immediately. Soak to a depth of 4 to 6 inches. Replace sod that grows poorly. Do not cut or lay sod in extremely wet or cold weather. Do not mow regularly until sod is well established.

3.05 INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES

A. All erosion and sediment control products and materials shall be installed per manufacturer's recommendations and in accordance with the Kentucky Erosion Prevention and Sediment Control Field Guide.

B. Contractor shall pay special attention to the trenching-in of the bottoms of silt fence, the staking of sediment barriers, and the stapling of erosion control blankets.

3.06 MAINTENANCE OF EROSION AND SEDIMENT CONTROL DEVICES

A. Erosion and sedimentation controls shall be inspected weekly and after rain events of 0.5 inch or greater. Replace silt fencing as needed, filter stone which is dislodged, erosion control blanket which is damaged, and make other necessary repairs.

B. Remove sediment from fences and barriers when it accumulates to half the height of the barrier, or more often as needed.

3.07 CLEAN UP

A. Upon completion of the project and/or establishment of satisfactory turf, vegetation or permanent erosion control structures, Contractor shall remove all temporary devices and properly dispose of such.

3.08 KPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

A. The Contractor is responsible for filing the appropriate Notice of Intent (NOI-SWCA) letter at least seven (7) days prior to start of construction activity for an electronic submittal, and at least thirty (30) days prior to start for a paper submittal. The Notice of Intent (NOI) is a Kentucky Pollution Discharge Elimination System (KPDES) permit application as provided by the Kentucky Revised Statutes, Chapter 224. This application is required to be submitted for construction projects that disturb one or more acres of land. A permit application form is included at the end of this section.

B. The NOI requires the inclusion of the descriptions of (but is not limited to) the following items:

1. Names and designated uses of any receiving waters
2. Anticipated number and locations of discharge points
3. Identification of planned construction in or along a water body

A topographic map showing project boundaries, areas to be disturbed, locations of anticipated discharge points and receiving waters is also required to be submitted with the NOI.

C. If the construction site is near a designated "High Quality/Impaired Waters" or a "Cold Water Aquatic Habitat Waters, Exceptional Waters, Outstanding National/State Resource Waters", additional items and/or individual permits will be required.

D. The NOI form requires an SIC code. The link to the SIC codes is http://www.osha.gov/pls/imis/sicsearch.html. The following are the typical construction SIC codes utilized:

1542 – Building Construction, nonresidential, except industrial and warehouses
1623 – Water Main Construction, Sewer Construction
1629 – Water and Wastewater Treatment Plant Construction
1711 – Water Pump Installation
1781 – Drilling Water Wells

E. The Contractor is responsible for developing, implementing and continuously updating a Stormwater Pollution Prevention Plan (SWPPP) before commencement of site disturbance. The SWPPP should include erosion prevention measures and sediment control measures which are installed and maintained to minimize discharges of sediments and other pollutants from a 2-year, 24-hour storm event. The SWPPP must be kept at the site and available for review by State officials, and must be updated as necessary through the course of the construction project.

F. The Contractor should receive notification from the Kentucky Division of Water of permit coverage within seven (7) days of an electronic submittal, and thirty (30) days of a paper submittal. Until receipt of notification that NOI is acceptable, site disturbance is not permitted.

G. Unless otherwise noted, the Contractor is responsible for completing and maintaining the required Self-Inspection Forms. A sample is included at the end of this specification section.]

H. Upon completion of the project and establishment of all permanent erosion and sediment control structures and devices, the Contractor shall submit the Notice of Termination (NOT) form to the Division of Water. This form is included at the end of this specification section.

I. All subcontractors are required to comply with the requirements of the Permit and the Stormwater Pollution Prevention Plan (SWPPP).

3.09 WHERE TO SUBMIT

A. Submit Notice of Intent (NOI) Form to: Operational Permits Section, SWP Branch, Division of Water, 200 Fair Oaks Lane, Frankfort, Kentucky 40601.

B. For an electronic submittal, go to https://dep.gateway.ky.gov/eForms/Default.aspx?FormID=3:

C. If project is within the jurisdiction of a defined "MS4" entity, a copy of the NOI must be submitted to that entity.

3.10 REQUIRED FOR THIS CONTRACT

A. The Contractor shall submit the signed NOI to the Kentucky Division of Water (address noted above) at least seven (7) days prior to the start of work activities for an electronic submittal, or thirty (30) days for a paper submittal. Do not begin site work until receiving notice of permit approval from the Division of Water.

B. Submit the NOI and locally required documents to the local regulatory agency.

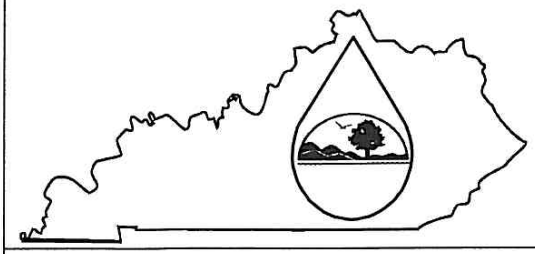
C. Develop, implement, and continuously update the Stormwater Pollution Prevention Plan (SWPPP).

D. Inspect and document the condition of runoff controls every seven (7) days and after each rain event of one-half inch or more. Maintain inspection reports at the site.

E. The Contractor shall file a Notice of Termination (NOT) when General Permit coverage is no longer needed (General Permits describe how this is done).

END OF SECTION

FORM NOI-SWCA



KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)

Notice of Intent (NOI) for coverage of Storm Water Discharges Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000

This is an application for:

- ☐ New construction activity.
- ☐ Modification of coverage for additional area in same watershed.
- ☐ Modification of coverage for additional area in different watershed.

If Modification is checked, state reason for Modification:	

For Agency Use	Permit No. (Leave Blank)	K	Y	R	1	0				
For Agency Use	AI ID (Leave Blank)									

SECTION I – FACILITY OPERATOR INFORMATION

Operator Name(s)*:		Phone:*
Mailing Address:*		Status of Owner/Operator: ☐Private ☐State ☐Federal ☐Public(other than state or federal)
City:*:	State:*	Zip Code:*

SECTION II – FACILITY/SITE LOCATION INFORMATION

Name of Project:*	Physical Address:*	City:*
State:*	Zip Code:*	County:*
Latitude (decimal degrees):*	Longitude (decimal degrees):*	SIC Code:*

SECTION III – SITE ACTIVITY INFORMATION

For single projects provide the following information

Total Number of acres in project:*	Total Number of acres to be disturbed:*	Start date:	Completion date:

For common plans of development projects provide the following information

Total Number of acres in project:*	Number of individual lots in development:	Number of lots to be developed:
Total acreage intended to be disturbed:*		Number of acres intended to be disturbed at any one time:
Start date:	Completion date:	List Contractors:

SECTION IV – DISCHARGE TO A WATER BODY

Name of Receiving Water:*	Anticipated number of discharge points:
Location of anticipated discharge points: Latitude (decimal degrees):*	Longitude (decimal degrees):*
Receiving Water Body Stream Use Designation	☐Cold Water Aquatic Habitat ☐Domestic Water Supply ☐Outstanding State Resource Water ☐Secondary Contact Recreation ☐Primary Contact Recreation ☐Warm Water Aquatic Habitat
Antidegradation Categorization	☐Outstanding National Resource Water ☐Exceptional Water ☐High Quality Water ☐Impaired Water
Name of Receiving Water:*	Anticipated number of discharge points:
Location of anticipated discharge points: Latitude (decimal degrees):*	Longitude (decimal degrees):*
Receiving Water Body Stream Use Designation	☐Cold Water Aquatic Habitat ☐Domestic Water Supply ☐Outstanding State Resource Water ☐Secondary Contact Recreation ☐Primary Contact Recreation ☐Warm Water Aquatic Habitat
Antidegradation Categorization	☐Outstanding National Resource Water ☐Exceptional Water ☐High Quality Water ☐Impaired Water

FORM NOI-SWCA

SECTION V – DISCHARGE TO AN MS4			
Name of MS4:		Date of application /notification to the MS4 for construction site coverage.	
Number of discharge points:	Location of each discharge point: Latitude (decimal degrees):*	Longitude (decimal degrees):*	
SECTION VI – CONSTRUCTION ACTIVITIES IN OR ALONG A WATER BODY			
Will the project require construction activities in a water body or the riparian zone: ☐ Yes ☐ No			
If yes, describe scope of activity:			
Is a Clean Water Act 404 permit required: ☐ Yes ☐ No		Is a Clean Water Act 401 Water Quality Certification required: ☐ Yes ☐ No	
SECTION VII – NOI PREPARER INFORMATION			
First Name:*	Last Name:*	Phone :*	eMail Address:*
Mailing Address:*	City:*	State:*	Zip Code:*
SECTION VIII – ATTACHMENTS			
Attach a full size color USGS 7½-minute quadrangle map with the facility site clearly marked. USGS maps may be obtained from the University of Kentucky, Mines and Minerals Bldg. Room 106, Lexington, Kentucky 40506. Phone number (859) 257-3896.			
SECTION IX – CERTIFICATION			
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 gather and evaluate 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 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.			
Signature:*	First Name:*	Last Name:*	
Phone:*	eMail Address:	Date:*	

This completed application form and attachments should be sent to: SWP Branch, Division of Water, 200 Fair Oaks, Frankfort, Kentucky 40601. Questions should be directed to: SWP Branch, Operational Permits Section at (502) 564-3410.

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM
FORM NOI-SWCA – INSTRUCTIONS

WHO MUST FILE A NOTICE OF INTENT (NOI) FORM

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity to a water body of the Commonwealth of Kentucky without a Kentucky Pollutant Discharge Elimination System (KPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under the KPDES Storm Water General Permit. If you have questions about whether you need a permit under the KPDES Storm Water program, or if you need information as to whether a particular program is administered by the state agency, call the **Storm Water Contact, Operational Permits Section, Kentucky Division of Water at (502) 564-3410.**

WHERE TO FILE NOI FORM

NOIs must be sent to the following address or submitted in on-line at https://dep.gateway.ky.gov/eForms/Default.aspx?FormID=3:

Operational Permits Section
SWP Branch, Division of Water
200 Fair Oaks Lane
Frankfort, KY 40601

Electronic NOI-SWCAs are to be submitted a minimum of seven (7) working days prior to commencement of construction related activities. Paper NOI-SWCAs are to be submitted a minimum of thirty (30) working days prior to commencement of construction related activities.

COMPLETING THE FORM

Enter information in the appropriate areas only. (*) denotes a required field. Enter N/A (Not Applicable) for fields that are required but do not apply to your submission. If you have any questions regarding the completion of this form call the **Storm Water Contact, Operational Permits Section, at (502) 564-3410.**

SECTION I – FACILITY OPERATOR INFORMATION

Operator Name(s): Enter the name or names of all operators applying for coverage under KYR10 using this NOI.
Mailing Address, City, State, and Zip Code: Provide the mailing address of the primary operator
Phone No.: Provide the telephone numbers of the person who is responsible for the operation.
Status of Owner/Operator: Select the appropriate legal status of the operator of the facility from the dropdown list.

Federal
Public (other than federal or state)
State
Private

SECTION II – FACILITY/SITE LOCATION INFORMATION

Name of Project: Provide the name of the project.
Physical Address, City, State, Zip Code and County: Provide the physical address of the project.
Latitude/Longitude: Provide the general site latitude and longitude of the operation.
SIC Code: Enter the Standard Industrial Code for the project

SECTION III –SITE ACTIVITY INFORMATION

For single projects provide the following information:

Total number of acres in project: Indicate the total acreage of the project including both disturbed and undisturbed areas.
Total number of acres to be disturbed: Indicate the total number of acres of the project to be disturbed.
Anticipated start date: Indicate the approximate date of when construction activities will begin.
Anticipated completion date: Indicated the approximate date of when final stabilization will be achieved.

For common plans of development provide the following information:

Total number of acres in project: Indicate the total acreage of the project including both disturbed and undisturbed areas.
Number of individual lots in development, if applicable: Indicate the number of individual lots or unit in the common plan of development
Number of lots to be developed: Indicate the number of lots that you intend to develop.
Total acreage of lots intended to develop: Indicate the total acreage of the lots you intend to develop
Total acreage intended to disturb: Indicate the total acreage of the lots you intend to disturb
Number of acres intended to disturb at any one time: Indicate the maximum number of acres to be disturbed at any one time.
Anticipated start date: Indicate the approximate date of when construction activities will begin.
Anticipated completion date: Indicated the approximate date of when final stabilization will be achieved.
List of contractors: Provide the names of all known contractors that will be working on site.

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM
FORM NOI-SWCA – INSTRUCTIONS

SECTION IV – IF THE PERMITTED SITE DISCHARGES TO A WATER BODY THE FOLLOWING INFORMATION IS REQUIRED

Name of Receiving Water: Provide the names of the each water body receiving discharges from the site. Provide only official USGS names do not provide local names
Anticipated number of discharge points: Indicate the number of discharge points to each receiving water body.
Location of anticipated discharge points: Provide the latitude and longitude of each discharge point. Add points as necessary.
Receiving Water Body Stream Use Designation: Check all appropriate boxes
Antidegradation Categorization: Select from the drop down box one of the following:

Outstanding National Resource Water
Exceptional Water
High Quality Water
Impaired Water

SECTION V – IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED

Name of MS4: Provide the name of the MS4 to which the activity will discharge
Number of discharge points to the MS4: Indicate the number of discharge points
Location of each discharge point: Provide the latitude and longitude of each discharge point. Add points as necessary
Date of application/notification to the MS4 for construction site permit coverage: Indicate the date the MS4 has or will be notified.

SECTION VI – CONSTRUCTION ACTIVITIES IN OR ALONG A WATER BODY

Will the project require construction activities in a water body or the riparian zone: Select Yes or No from the drop down box.
If Yes, describe scope of activity: Provide a brief description of the activity (ies) that will take place in the water body or the riparian zone.
Is a Clean Water Act 404 permit required: Select Yes or No from the drop down box.
Is a Clean Water Act 401 Water Quality Certification required: Select Yes or No from the drop down box.

SECTION VII – NOI PREPARER INFORMATION

Provide the name, mailing address, telephone number and eMail address of the person preparing the NOI.

SECTION VIII –Attachments

Attach a USGS topographic map indicating the location of the activity and the proposed discharge points.

SECTION IX – CERTIFICATION

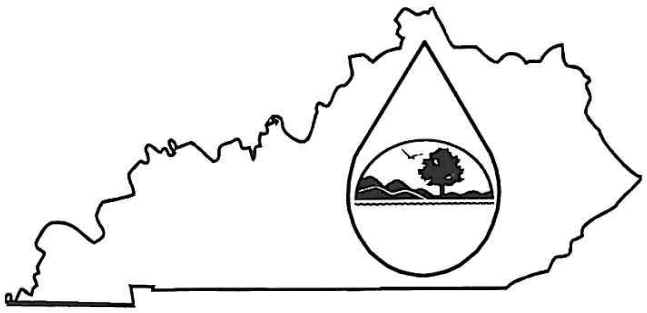
Provide the name, mailing address, telephone number and eMail address of the person who is responsible for the activity

Signature: Provide full name of the responsibility party. This will constitute a signature.

The NOI must be signed as follows:

Corporation: by a principal executive officer of at least the level of vice president
Partnership or sole proprietorship: by a general partner or the proprietor respectively

KPDES FORM NOT-SW



Kentucky Pollutant Discharge Elimination System (KPDES)

NOTICE OF TERMINATION (NOT)
of Coverage Under the KPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the KPDES program.

ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.
(Please see instructions on back before completing this form.)

I. PERMIT INFORMATION
KPDES Storm Water General Permit Number:
Check here if you are no longer the Operator of the Facility: ☐
Check here if the Storm Water Discharge is Being Terminated: ☐
II. FACILITY OPERATOR INFORMATION
Name:
Address:
City/State/Zip Code:
Telephone Number:
III. FACILITY/SITE LOCATION INFORMATION
Name:
Address:
City/State/Zip Code:

Certification: I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a KPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity of waters of the Commonwealth is unlawful under the Clean Water Act and Kentucky Regulations where the discharge is not authorized by a KPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Kentucky Revised Statutes.

NAME (Print or Type)	TITLE
SIGNATURE	DATE

Revised June 1999

INSTRUCTIONS
NOTICE OF TERMINATION (NOT) OF COVERAGE UNDER THE KPDES GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY

Who May File a Notice of Termination (NOT) Form
Permittees who are presently covered under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26 (b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a KPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles have been employed.

Where to File NOT Form
Send this form to the following address:

Section Supervisor
Inventory & Data Management Section
KPDES Branch, Division of Water
14 Reilly Road, Frankfort Office Park
Frankfort, KY 40601

Completing the Form
Type or print legibly in the appropriate areas and according to the instructions given for each section. If you have questions about this form, call the Storm Water Contact, Industrial Section, at (502) 564-3410.

Section I - Permit Information
Enter the existing KPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, **call the Storm Water Contact, Industrial Section at (502) 564-3410.**

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II - Facility Operator Information
Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III - Facility/Site Location Information
Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quater, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV - Certification
Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive

Revised June 1999

KENTUCKY CONSTRUCTION SITE INSPECTION REPORT

Utility Line Projects

KENTUCKY EROSION AND SEDIMENT CONTROL PERMIT COMPLIANCE INSPECTION REPORT

General Site Information:

Company:	**County:**
Site:	**Date:**

Permit Compliance Information:

	Yes	No
Copy Of Permit kept on site		
Copy of Best Management Practices (BMP) Plan kept on site		
Site specific description of project timing/phasing and implementation		
Adequate site map showing:		
• Drainage patterns indicated on plan		
• Receiving waters (stream, river, lake, wetland, etc.) named		
• Approximate slopes after major grading		
• Area of soil disturbance		
• Undisturbed areas and vegetative buffer zones		
• Location of structural and non-structural controls (BMPs)		
• Areas where stabilization practices are to be employed		
• Storm water discharge locations		

Specific Site Information:

Name of receiving stream:	
Total area of site:	
Area disturbed:	

Inspection Results:

Inspection Criteria: Satisfactory, Marginal, Unsatisfactory	S	M	U
Condition of receiving stream is BMP Plan adequately implemented?			
Timely seedling and mulching			
• Revegetation on cut/fill/cleared areas			
• Condition of slope areas			
Structural Controls			
• Drainage ditch protection/liners installed			
• Inlet protection for curb drains, etc.			
• Outlet protection – no erosion or scour			
• Silt fences below bare soil areas			
• Rock check dams in ditches			
• Sediment traps/ponds maintained			
• Other controls			

Other Controls			
• Secondary containment for fuel; maintenance area designated			
• Proper disposal of concrete wastes; wash in designated area			
• Other (non-storm water discharge, etc.)			
• Off-site tracking of sediment prevented			
Compliance with State and Local Regulations			
• Waste, fertilizer, paint, pesticide/herbicide storage and disposal			
• Proper sewage management			
Operation and Maintenance of BMPs			
• Maintenance plan incorporated into written BMP Plan			
• Maintenance plan followed			
• Maintenance documented			
• Inspections done as required and documented			
• Inspection reports completed and maintained on site, in file			
Contractor Certification on File			
Plan Certification on File			

Comments:

_____

Inspector's Signature

Kentucky Best Management Practices Plan • Construction Site Inspection Report

Company:	**Site:**	**County:**
Site Operator:		**Date:**
Receiving Water:	**Total Site Area (acres):**	**# Disturbed Acres:**
Inspector Name:	**Inspector Qualifications:**	
Inspection Type: Weekly or ½ Inch Rain	**Days Since Last Rainfall** ____	**# Inches of Last Rainfall:** _____

Field Inspection Observations

BMP Category	Compliance Yes	No	N/A	Field Indicators for Compliance
Project Operations				Notice of Intent (KPDES permit) and other local/state permits on file BMP Plan on site and available for review Project timing/schedule and activities following BMP Plan Weekly inspection and rain-event reports on BMPs available for review Diversions, silt checks/traps/basins, and silt fences/barriers installed prior to clearing Grading and clearing conducted in phases to minimize exposed soil areas No vegetation removal or operations in stream or sinkhole buffer area (25-50 ft min) Rock pad in place on all construction site exits leading to paved roads No sediment, mud, or rock on paved public roads in project area Dust control if needed when working in residential areas during dry conditions
Drainage Management				Upland runoff diverted around bare soil areas with vegetated/lined ditches/berms Drainage channels exiting the site are lined with grass/blanket/rock and stabilized Discharges from dewatering operations cleaned in silt fence enclosure or other filter No muddy runoff leaving site after rains up to 1½ inches
Erosion Protection				Exposed soil seeded/mulched after 2 weeks if no work is planned for the next 7 days Soils on steep slopes seeded/mulched/blanketed as needed to prevent rutting
Sediment Barriers				Silt fence, rock filter, or other sediment barrier below all bare soil areas on slopes Barrier installed across slope on the contour, trenched in, posts on downhill side Multiple sediment barriers at least 125 ft apart on unseeded slopes steeper than 4:1 J-hook interceptors along silt fence where heavy muddy flows run along fencing No visible undercutting or bypassing or blowout of sediment barrier Accumulated sediment is less than halfway to the top of sediment barrier
Slope Protection				Slopes tracked, disked, or conditioned after final grade is established Slopes seeded, mulched, or blanketed within 21 days, no unmanaged rills or gullying Heavy downslope flows controlled by lined downdrain channels or slope drain pipes No muddy runoff from slopes into streams, rivers, lakes, or wetlands
Inlet Protection				Inlet dam/device or filtration unit placed at all inlets receiving muddy flows No visible undercutting, bypassing, or blowout of inlet protection dam or device Accumulated sediment is less than halfway to the top of the inlet protection dam/device
Outlet Protection				High flow discharges have rock or other flow dissipaters of adequate sizing at outlet Culvert outlets show no visible signs of erosion/scour, bank failure, or collapse
Ditch and Channel Stabilization				No unmanaged channel bank erosion or bottom scouring visible within or below site Ditches with slopes more than 3% have check dams spaced as needed, if not grassed Ditch check dams tied in to banks, with center 4" lower than sides, and no bypassing Ditches with slopes of up to 5% are thickly seeded with grass (minimum requirement) Ditches 5% to 15% are lined with thick grass and erosion control blankets as needed Ditches 15% to 33% are lined with thick grass and matting or other approved product Ditches exceeding 33% are paved or lined with rock or other approved product

Sediment Traps and Basins				Storage volume is at least 134 cubic yards for each acre of bare soil area drained Trap or basin is seeded/mulched and stabilized; no collapsing sidewalls or banks Outlet structure is stable and consists of rock-lined notched overflow or outlet riser Rock overflow is 6" lower in center to control overflow discharge Outlet riser pipe has concrete & rock base, ½ inch holes every 3" to 6", and trash rack Area near pipe outlet or overflow is stable, with no scour or erosion Sediment removed before trap or basin is halfway full; disposal is away from ditches
Maintenance of EPSC Management Practices				Sediment behind silt fence and other filters does not reach halfway to top Sediment traps and basins are less than half full of sediment Gullies repaired, silt fences and other controls inspected and repaired/replaced Written documentation of controls installed, inspection results, and repairs performed All controls removed and areas graded, seeded, and stabilized before leaving site
Materials Storage, Handling, and Cleanup				Materials that may leach pollutants stored under cover and out of the weather Fuel tanks located in protected area with double containment system Fuel and/or other spills cleaned up promptly; no evidence of unmanaged spills No evidence of paint, concrete, or other material washouts near drain inlets No storage of hazardous or toxic materials near ditches or water bodies
Waste Disposal				Trash, litter, and other debris in proper containers or properly managed No litter or trash scattered around on the construction site Provisions made for restroom facilities and/or other sanitary waste management Sanitary waste facilities clean and serviced according to schedule No disposal of any wastes into curb or other inlets, ditches, streams, or water bodies

Inspection Notes and Key Observations

List of Stabilized Areas: Vegetation is Established; Ditches are Stabilized; No Exposed Soil
Other Notes or Observations:
Corrective Actions Taken and/or Proposed Revisions to BMP Plan:

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System (KPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature of Inspector: _____

SECTION 02400 - BORING AND JACKING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required to furnish and install all bored and jacked carrier pipes in encasement pipes under railroad and highway crossings as shown on the Drawings and/or specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02300

B. Piping: Division 2

1.03 SUBMITTALS

A. Descriptive literature, catalog cuts, and dimensional prints clearly indicating all dimensions and materials of construction, shall be submitted on all items specified herein to the Engineer for review before ordering.

B. At the time of submission, the Contractor shall, in writing, call the Engineer's attention to any deviations that the submittals may have from the requirements of the Contract Drawings and Specifications.

C. Comply with all requirements of Section 01340.

D. In accordance with the requirements of the General and Special Conditions and this Section, the following table includes, but is not limited to, the items required to be submitted:

Item Description	Shop Drawings	Product Data	Schedules	Installation Data	Parts Lists	Wiring Diagram	Samples	O & M Manual	Certificates	Warranty	Report	Other
Carrier Pipe		X							X			
Casing Pipe		X										
Casing Spacers		X		X								
Casing End Seals		X		X								

PART 2 - PRODUCTS

2.01 CARRIER PIPE

A. Carrier pipe shall be as specified in the applicable Division 2 section unless otherwise noted.

2.02 CASING PIPE

A. Casing pipe shall be steel, plain end, have a minimum yield point strength of 35,000 psi and conform to ASTM A 252 Grade 2 or ASTM A 139 Grade B without hydrostatic tests. The steel pipe shall have welded joints and be in at least 18 foot lengths. The exterior of the casing pipe shall be coated with a VOC-compliant coal tar epoxy.

B. The diameter of the casing pipe shall be as follows:

Carrier Pipe Nominal Diameter (Inches)															
4	6	8	10	12	14	15	16	18	20	21	24	27	30	33	36
Casing Pipe Nominal Diameter (Inches)															
10	12	16	18	20	24	24	30	30	30	36	36	42	48	50	50

For carrier pipe sizes greater than 36-inches nominal diameter, the casing pipe diameter size shall be determined by the Engineer or as shown on the Contract Drawings.

C. The wall thickness of the casing pipe shall be as follows:

Casing Pipe Nominal Diameter (Inches)								
Under 20	20 & 22	24	30	36	38	42	48	50
Casing Pipe Nominal Thickness (Inches)								
.250	.281	.312	.406	.469	.500	.562	.625	.656

However, should casing pipe thickness be specified or required on Highway or Railroad permit approval sheets, said permit thickness requirement shall govern. Permit approval sheets will be made available to the Contractor.

2.03 CASING SPACERS

A. Stainless Steel Casing Spacers: Stainless steel casing spacers shall be bolt-on style with a shell made in two (2) sections of heavy T-304 stainless steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner .090" thick with 85-90 durometer. All nuts and bolts are to be 18-8 stainless steel. Runners shall be made of ultra high molecular weight polymer with inherent high abrasion resistance and a low coefficient of friction. Runners shall be supported by risers made of heavy T-304

stainless steel. The supports shall be mig welded to the shell and all welds shall be fully passivated. Stainless steel casing spacers shall be made by Cascade Waterworks Mfg. Co., or equal.

B. Solid Polyethylene Casing Spacers (to be used with PVC pipe only): Solid polyethylene casing spacers shall be bolt-on style with a shell made in two (2) sections. Carrier pipe shall be wrapped with rubber strap inside casing space to prevent slippage. All nuts and bolts are to be 18-8 stainless steel. Solid polyethylene casing spacers shall be made by Calpico Inc., Advance Products & Systems, Inc., or equal.

2.04 CASING END SEALS

A. Wrap-around end seals - Wrap-around end seals shall be made of a waterproof flexible coal tar membrane reinforced with fiberglass, or synthetic rubber. The two exposed edges of the wrap-around seal shall be adhesively bonded forming a watertight seal. The ends of the wrap shall be sealed on the casing and carrier pipe by stainless steel bands. Wrap-around end seals shall be made by Calpico Inc., Advance Products & Systems, Inc., or equal.

B. Upon approval the by Engineer, in lieu of wrap-around end seals, each end of the casing pipe and the carrier pipe shall be wrapped with two (2) layers of roofing felt.

PART 3 - EXECUTION

3.01 CROSSINGS - GENERAL

A. Where designated on the drawings, crossings beneath state maintained roads, not to be disturbed shall be accomplished by boring and jacking a casing pipe.

B. Steel casing pipe for crossings shall be bored and/or jacked (or open cut installed where indicated on the Drawings) into place to the elevations shown on the drawings. All joints between lengths shall be solidly butt-welded with a smooth non-obstructing joint inside. The casing pipe shall be installed without bends. The carrier pipe shall be installed after the casing pipe is in place, and shall extend a minimum of two (2) feet beyond each end of the casing to facilitate making joint connections. The carrier shall be braced and centered with casing spacers within the casing pipe to preclude possible flotation. Casing spacers shall be installed a maximum of eight (8) feet apart along the length of the carrier pipe within the casing pipe, within two (2) feet of each side of a pipe joint, and the rest evenly spaced. The height of the supports and runners combined shall be sufficient to keep the carrier pipe at least 0.75" from the casing pipe wall at all times. Manufacturer’s recommendations may govern these requirements.

C. At each end of the casing pipe, the carrier pipe shall be sealed with casing end seals. The end seals shall extend a minimum of 12 inches in each direction from the end of the casing pipe.

D. Wood skids are not an acceptable method of supporting the carrier pipe.

3.03 BORING AND JACKING

A. The Contractor shall excavate his own pits, as he may deem necessary, and will set his own line and grade stakes which shall be checked by the Engineer. Permits, as required, will be furnished or obtained by the Owner, but shall be in the Contractor's hands before any excavating is commenced.

B. The boring method shall consist of pushing the pipe into the earth with a boring auger rotating within the pipe to remove the spoil.

1. The front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger from leading the pipe so that there will be no unsupported excavation ahead of the pipe.

2. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. If the obstruction cannot be removed without excavation in advance of the pipe, the pipe shall be abandoned in place and immediately filled with grout.

3. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than 2 inch. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than approximately 1 inch, grouting or other approved methods must be used to fill such voids.

4. The face of the cutting head shall be arranged to provide a reasonable obstruction to the free flow of soft or poor material.

5. Any method which does not have this boring arrangement will not be permitted. Contractor's boring arrangement plans and methods must be submitted to, and approved by, the Engineer.

C. In the event an obstruction is encountered in boring which cannot be removed and it becomes necessary to withdraw the casing and commence elsewhere, the hole from which the casing is withdrawn shall be completely backfilled with coarse sand rammed in.

D. Insurance to be furnished by the Contractor to cover this type of work shall be adequate to meet the requirements of the Railroad and/or State or County Highway Departments. Insurance shall consist of comprehensive general liability and automobile liability insurance.

E. Before award of the contract, the Contractor shall furnish a statement of his experience of such work, or if inexperienced, shall advise the Owner as to whom he will sublet the work and give a statement of the experience of the subcontractor, which shall be satisfactory to the Owner.

3.04 CONTRACTOR'S RESPONSIBILITIES

A. Obtain a copy of the Highway Encroachment Permit before beginning construction.

B. Attend a preconstruction meeting at the construction site with the City Inspector, Highway Inspector Engineer, and Contractor being present.

C. Contractor shall be responsible for protecting, temporarily supporting, bracing or if required relocating any existing utility that would be affected by the location of the bore pit.

END OF SECTION

SECTION 02510 - WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required for furnishing and installing all piping and appurtenances specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Valves - Utility Services: Section 02515

B. Hydrants: Section 02517

1.03 SUBMITTALS

A. A notarized certification shall be furnished for all pipe and fittings that verifies compliance with all applicable specifications.

B. The requirement for this certification does not eliminate the need for shop drawings submittals in compliance with Section 01340.

1.04 EXISTING CONDITIONS

A. The existing piping shown on the Contract Drawings is based on the best available information. The Engineer makes no guarantee as to the accuracy of the locations or type of piping depicted. All new piping which ties into existing lines must be made compatible with that piping.

B. So that piping conflicts may be avoided, Contractor shall open up his trench well ahead of the pipe laying operation to confirm exact locations of existing piping before installing any new piping.

C. Contractor shall provide all fittings and adapters necessary to complete all connections to existing piping.

1.05 QUALITY ASSURANCE

A. Install ductile iron piping to meet the current requirements of the Water System and Sewerage Systems Improvement Specifications of the BGMU, Bowling Green, Kentucky and all referenced standards Bowling Green, Kentucky and all referenced standards herein.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Upon delivery and before unloading, the Contractor must inspect the pipe for any damage occurred in transit; note such damage on the delivery ticket.

B. The means by which the pipe is unloaded is the decision and responsibility of the Contractor. The Contractor should follow the recommendations of the manufacturer.

C. The Contractor shall follow manufacturer's recommendations for storage of pipe in order to minimize damage prior to installation.

D. The Contractor shall adhere to the Standard procedures given by the manufacturer for handling the pipe.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE AND FITTINGS

A. Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, latest revision, pressure class 350, with push-on joints unless otherwise noted on Drawings.

B. The interior of the pipe shall be cement-mortar lined with bituminous seal coat in accordance with ANSI/AWWA C104/A21.4, latest revision. Thickness of the lining shall be as set forth in the ANSI/AWWA C104/A21.4 specification unless otherwise directed by the Engineer. The exterior of all pipe, unless otherwise specified, shall receive either coal tar or asphalt base coating a minimum of 1 mil thick.

C. Each piece of pipe shall bear the manufacturer's name or trademark, the year in which it was produced and the letters "DI" or the word "DUCTILE". Pipe manufacturer shall furnish notarized certificate of compliance to the above AWWA or ANSI specifications.

D. Fittings shall be pressure class 350 ductile iron and have mechanical-joints or push-on joints in accordance with ANSI/AWWA C110/A21.10, latest revision and shall conform to the details and dimensions shown therein. Fittings shall have interior cement-mortar lining as specified hereinbefore for the pipe. Compact ductile iron fittings meeting the requirements of ANSI/AWWA C153/A21.53, latest revision, will also be acceptable.

E. Joints for ductile iron pipe and fittings, as described hereinbefore, shall be rubber-gasket joints and be in accordance with ANSI/AWWA C111/A21.11, latest revision. Joints shall have the same pressure rating as the pipe or fitting of which they are a part. Joints shall be installed per the manufacturer's recommendations.

F. Provide ANSI/AWWA C110/A21.10 mechanical joint plugs and locked or restrained pipe joints where indicated on Drawings. Fittings under structures shall be mechanical joint with retainer glands.

2.02 TIED JOINT RESTRAINT SYSTEM

A. Restraint system for fittings shall be "Star" Joint Restraint System as manufactured by Star National Products, Mega Lug Series 1100, or approved equal. The restraint system shall be included with each bend (fitting and valve) in addition to the concrete thrust block.

2.03 COUPLING AND ADAPTORS

A. Flexible couplings shall be of the sleeve type with a middle ring, two wedge shaped resilient gaskets at each end, two follower rings, and a set of steel trackhead bolts. The middle ring shall be flared at each end to receive the wedge portion of the gaskets. The follower rings shall confine the outer ends of the gaskets, and tightening of the bolts shall cause the follower rings to compress the gaskets against the pipe surface, forming a leak-proof seal. Flexible couplings shall be steel with minimum wall thickness of the middle ring or sleeve installed on pipe being 5/16-inch for pipe smaller than 10 inches, 3/8-inch for pipe 10 inches or larger. The minimum length of the middle ring shall be 5-inches for pipe sizes up to 10 inches and 7 inches for pipe 10 inches to 30 inches. The pipe stop shall be removed. Gaskets shall be suitable for 250 psi pressure rating or at rated working pressure of the connecting pipe. Couplings shall be harnessed and be designed for 250 psi.

B. Flanged adapters shall have one end suitable for bolting to a pipe flange and the other end of flexible coupling similar to that described hereinbefore. All pressure piping with couplings or adapters shall be harnessed with full threaded rods spanning across the couplings or adapters. The adapters shall be furnished with bolts of an approved corrosion resistant steel alloy, extending to the adjacent pipe flanges. Flanges on flanged adapter (unless otherwise indicated or required) shall be faced and drilled ANSI B16.1 Class 125.

C. Flexible couplings and flanged adapters shall be as manufactured by Dresser, Rockwell, or equal, per the following, unless otherwise specified and/or noted on the Drawings:

D. Steel couplings for joining same size, plain-end, steel, cast iron, and PVC plastic pipe -

Dresser	Rockwell
Style 138	411

E. Transition couplings for joining pipe of different outside diameters-

Dresser	Rockwell
Style 162 (4"-12")	413 steel (2"-24")
Style 62 (2"-24")	415 steel (6"-48")
	433 cast (2"-16")
	435 cast (2"-12")

F. Flanged adapters for joining plain-end pipe to flanged pipe, fittings, valves and equipment.

Dresser	Rockwell
Style 127 cast (3"-12")	912 cast (3"-12")
Style 128 steel (3"-48" C.I. Pipe)	913 steel (3" and larger)
Style 128 steel (2"-96" steel pipe)	

2.04 LOCATOR WIRE

A. The Contractor shall install #12 coated traces wire with 3M splicers. This wire shall be taped to the top of the water main.

B. Tracer wire shall be pulled up and secured to each hydrant and in each valve box.

C. Payment for locator wire shall be included in the linear foot price bid of the appropriate bid item(s) unless it is listed as a separate payment item in the bid schedule.

2.05 CONCRETE PIPE ANCHORS, THRUST BLOCKS, CRADLE OR ENCASEMENT

A. Where indicated on the Drawings, required by the Specifications or as directed by the Engineer, concrete pipe anchors, thrust blocks, cradles or encasements shall be installed.

B. Concrete shall be 3000 psi, and reinforcing bars shall be as installed as indicated on the details.

2.06 CONNECTION OF NEW WATER MAINS TO EXISTING SYSTEM

A. The Contractor shall connect the new water main to existing water main where shown on the Drawings or directed by the Engineer, and shall furnish all necessary equipment and materials required to complete the connection.

PART 3 - EXECUTION

3.01 EXCAVATION FOR PIPELINE TRENCHES

A. Unless otherwise directed by the Engineer, trenches in which pipes are to be laid shall be excavated in open cut to the depths required by field conditions or as specified by the Engineer. In general this shall be interpreted to mean that machine excavation in earth shall not extend below an elevation permitting the pipe to be properly bedded. Installation shall be in accordance with ANSI/AWWA C600 for ductile iron and Cast Iron O.D. (AWWA) PVC pipe or ASTM F-645 for Iron Pipe O.D. (ASTM) PVC pipe except as modified herein.

B. If the foundation is good firm earth and the machine excavation has been accomplished as set out hereinbefore, the remainder of the material shall be excavated by hand, then the earth pared or molded to give full support to the lower quadrant of the barrel of each pipe. Where bell and spigot is involved, bell holes shall be excavated during this latter operation to prevent the bells from being supported on undisturbed earth. If for any reason the machine excavation in earth is carried below an excavation that will permit the type of bedding specified above, then a layer of granular material shall be placed so that the lower quadrant of the pipe will be securely bedded in compact granular fill.

C. Excavation may be undercut to a depth below the required invert elevation that will permit laying the pipe in a bed of granular material to provide continuous support for the bottom quadrant of the pipe. When this method is used, the bedding shall be as set out in Paragraph 3.02 hereinafter.

D. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe, but unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider then 2'-0" plus the nominal diameter of the pipe at the level of or below the top of the pipe. If the trench does become wider than 2'-0" at the level of or below the top of the pipe, special precaution may be necessary, such as providing compacted, granular fill up to top of the pipe or providing pipe with additional crushing strength as determined by the Engineer after taking into account the actual trench loads that may result and the

strength of the pipe being used. The Contractor shall bear the cost of such special precautions as are necessary.

E. All excavated materials shall be placed a minimum of two feet (2') back from the edge of the trench.

F. Before laying the pipe, the trench shall be opened far enough ahead to reveal obstructions that may necessitate changing the line or grade of the pipeline.

G. The trench shall be straight and uniform so as to permit laying pipe to lines and grades given by the Engineer. It shall be kept free of water during the laying of the pipe and until the pipeline has been backfilled. Removal of trench water shall be at the Contractor's expense. Dry conditions shall be maintained in the excavations until the backfill has been placed. During the excavation, the grade shall be maintained so that it will freely drain and prevent surface water from entering the excavation at all times. When directed by Owner, temporary drainage ditches shall be installed to intercept or direct surface water which may affect work. All water shall be pumped or drained from the excavation and disposed of in a suitable manner without damage to adjacent property or to other work.

H. Minimum cover of 42" shall be provided for all pipelines.

3.02 PIPE BEDDING

A. All pipe shall be supported on a bed of granular material, unless the trench has been prepared in accordance with Paragraph 3.01B. In no case shall pipe be supported directly on rock. Bedding shall not be a separate pay item unless otherwise set out in the Detailed Specifications. Bedding shall be provided in earth bottom trenches, as well as rock bottom trenches. Bedding material shall be free from large rock, foreign material, frozen earth, and shall be acceptable to the Engineer. Bedding shall be a minimum of 6" below pipe barrel and extend to the springline (horizontal center line) of the pipe.

B. In all cases the foundation for pipes shall be prepared so that the entire load of the backfill on top of the pipe will be carried on the barrel of the pipe so that none of the load will be carried on the bells.

C. The bedding shall be placed up to at least the spring line (horizontal center line) of the pipe. The bedding material and procedures shall conform to ASTM D 2321 and any Technical Specifications set out hereinafter. If conditions warrant, the Engineer may require the bedding to be placed above the springline of the pipe. Granular bedding shall be Size #9-m or ASTM C 33, Size #7 crushed stone, fine gravel, or sand, and is not a separate pay item.

D. Where undercutting and granular bedding is involved it shall be of such depth that the bottom of the bells of the pipe will be at least three inches above the bottom of the trench as excavated. Undercutting is not a separate pay item.

E. In wet, yielding mucky locations where pipe is in danger of sinking below grade or floating out of line or grade, or where backfill materials are of such a fluid nature that such movements of the 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. When ordered by the Engineer, yielding and mucky materials in subgrades shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe. Crushed stone or other such granular material, if necessary, as determined by the

Engineer to replace poor subgrade material, shall be a separate pay item and classified as "Special Pipe Bedding". Removal of poor material is not a separate pay item.

F. Installation shall be in accordance with ASTM D 2321 except as modified hereinafter.

3.03 SPECIAL PIPE BEDDING

A. Granular material for "Special Pipe Bedding" where required shall be Department of Transportation crushed limestone, Size #9.

3.04 LAYING PIPE

A. The laying of pipe in finished trenches shall be commenced at the lowest point so the spigot ends point in the direction of flow.

B. All pipes shall be laid with ends abutting and true to line and grade as given by the Engineer. Supporting of pipes shall be as set out hereinbefore under "Pipe Bedding" and in no case shall the supporting of pipes on blocks be permitted.

C. Before each piece of pipe is lowered into the trench, it shall be thoroughly inspected to insure that it is clean. Each piece of pipe shall be lowered separately unless special permission is given otherwise by the Engineer. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. 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.

D. Pipe shall not be laid on solid rock. A pad of granular material as specified in Paragraph 3.02 "Pipe Bedding", shall be used as a pipe bedding. Pipe bedding is not a separate pay item. Irregularities in subgrade in an earth trench shall be corrected by use of granular material.

E. When ordered by the Engineer, unsuitable materials in subgrades shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe.

F. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood or fabricated plug fitted into the pipe bell, so as to exclude earth or other material, and precautions taken to prevent flotation of pipe by runoff into trench.

G. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has had an opportunity to make an inspection of the joints, alignment and grade, in the section laid.

3.05 BACKFILLING PIPELINE TRENCHES

A. Backfilling of pipeline trenches shall be accomplished as shown on the Drawings and with the requirements set forth in Section 02300 “Earthwork”. Before final acceptance, the Contractor will be required to level off all trenches or to bring the trench up to grade. The Contractor shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction. In the event that pavement is not placed immediately following trench backfilling in paved areas, the Contractor

shall be responsible for maintaining the trench surface in a level condition at proper pavement grade at all times.

B. Method "1" - Backfilling in Open Terrain (outside State's R.O.W.).

Backfilling of pipeline trenches in open terrain, outside the State's R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench, from the pipe bedding to a point 12" above the top of the pipe, shall be backfilled No. 9 crushed stone. This material shall be placed in a manner approved by the Engineer, and shall be carefully compacted to avoid displacement of the pipe.

2. The upper portion of the trench above the compacted portion shall be backfilled with material which is free from large rock. Incorporation of rock having a volume exceeding one-half cubic foot is prohibited. Backfilling this portion of the trench may be accomplished by any means approved by the Engineer. The trench backfill shall be heaped over or leveled as directed by the Engineer.

C. Method "2" - Backfilling in open areas (inside State's R.O.W.).

Backfilling of pipeline trenches in open areas inside State's R.O.W. shall be accomplished in the following manner.

1. The lower portion of the trench, from the pipe springline (horizontal center) to a point 6" below the grade line, shall be backfilled with No. 9 crushed stone. This portion of the trench shall be wrapped with geotextile fabric per Section 02300 and the Standard Detail Drawings.

2. The top 6" of trench shall be backfilled with heaped backfill, free of rock, with mechanical tamping. However, should this occur at an existing sidewalk or driveways the upper portion of the trench shall be temporarily backfilled and maintained with crushed stone or gravel until such time as the sidewalk is constructed or the driveway surface is restored.

D. Method "3" – Backfilling Under Streets, Roads, and Paved Driveways (inside State R.O.W.).

Backfilling of pipeline trenches under streets, roads and paved driveways (inside State R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench, from the pipe bedding to a point 12 inches above the top of the pipe, shall be backfilled with No. 9 crushed stone. This material shall be placed in a manner to avoid displacement of the pipe.

2. The middle portion of the trench, from a point 12" above the top of the pipe to a point even with the bottom of the existing pavement shall be backfilled with flowable fill per Section 02300 and the Standard Detail Drawings.

E. Method "4" - Backfilling Under Streets, Roads, and Paved Driveways (outside the State's R.O.W.):

Backfilling of pipeline trenches under streets, roads and paved driveways(outside State's R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench from the pipe bedding to a point 6" below the bottom of the pavement or concrete sub-slab, shall be backfilled with No. 9 crushed stone.

2. The upper portion of the trench, from a point 6" below the bottom of the pavement or concrete sub-slab to grade, shall be backfilled with a base course of dense graded aggregate. At such time that pavement replacement is accomplished, the excess base course shall be removed as required.

F. All backfilling methods are shown on the Detail Drawings. When directed by the Engineer, the Contractor shall wet backfill material to assure maximum compaction.

Before final acceptance, the Contractor will be required to level off all trenches or to bring the trench up to grade. The Contractor shall also remove from roadways, rights-of-ways and/or private property all excess earth or other materials resulting from construction.

In the event that pavement is not placed immediately following trench backfilling in streets and highways, the Contractor shall be responsible for maintaining the trench surface in a level condition at proper pavement grade at all times.

3.06 SETTLEMENT OF TRENCHES

A. Whenever lines are in, or cross, driveways and streets, the Contractor shall be responsible for any trench settlement which occurs within these rights-of-way within one (1) year from the time of final acceptance of the work. If paving shall require replacement because of trench settlement within this time, it shall be replaced by the Contractor at no extra cost to the Owner. Repair of settlement damage shall meet the approval of the Owner.

3.07 CONCRETE THRUST BLOCKS, CRADLE, ANCHORS OR ENCASEMENT

A. Concrete thrust blocks, cradle, anchors or encasement shall be placed where shown on the Drawings, required by the Specifications, or as directed by the Engineer.

B. For cradle and encasement, concrete shall be 3000 psi and shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed.

C. For thrust blocks and anchors, concrete shall be 3000 psi, and shall be formed or be sufficiently stiff to maintain the forms indicated on the Details.

D. In tamping concrete, care shall be taken not to disturb the grade or line of the pipe or injure the joints. Concrete placed outside the specified limits or without authorization from the Engineer will not be subject to payment.

E. Water mains shall have concrete thrust or “kicker” blocks at all pipe intersections and changes of direction to resist forces acting on the pipeline. All reducers (increasers) shall be anchored. In addition to installing a concrete thrust block behind a fitting, a tied joint restraint system shall be used. The restraint system shall be installed in accordance with manufacturer’s instructions so as to prevent joint separation under operating conditions.

3.08 BITUMINOUS CONCRETE HIGHWAY, STREET AND DRIVEWAY REPLACEMENT

A. The Contractor shall replace those sections of existing roads, streets and driveways required to be removed to install the pipe lines under this contract. He shall construct same to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to the operations.

B. Prior to trenching, the pavement shall be scored or cut to straight edges at least twelve (12) inches outside each edge of the proposed trench to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be re-cut and trimmed to square, straight edges after the pipeline has been installed and prior to placing the new base and pavement.

C. Backfilling of the trench shall be in accordance with Method "3" or “4” as described hereinbefore. Base course for the paving shall be dense graded crushed limestone furnished and placed in accordance with the current requirements of the Standard Specifications for Road and Bridge Construction of the Department of Transportation, to a depth of six (6) inches in roads and streets and four (4) inches in driveways, unless flowable fill is required.

D. A subslab of reinforced concrete shall be placed for state maintained highways as indicated on the Drawings. The subslab shall have a minimum thickness of 6 inches. Concrete for the subslab shall be 2500 psi, in accordance with the Details shown on the Drawings.

3.09 UNPAVED DRIVEWAY (CRUSHED STONE) SURFACE REPLACEMENT

A. The Contractor shall replace those sections of existing driveways and parking areas required to be removed to install the pipe lines under this contract. He shall construct same to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to the operations.

3.10 REMOVING AND REPLACING CONCRETE CURB AND GUTTER OR SIDEWALK

A. The Contractor shall remove the curb and gutter or sidewalk when encountered when required for laying the pipe. Only that portion of the curb and gutter or sidewalk needed to lay the pipe shall be removed.

B. Where concrete curb and gutter or sidewalk is removed or disturbed during the construction work, it shall be replaced, using 3000 psi concrete, in fully as good or better condition than that which existed prior to the Contractor's operation.

3.11 REPLACEMENT OF EXISTING MAIL BOXES, CULVERTS, CLOTHES LINE POSTS, FENCES AND OTHER SUCH FACILITIES

A. Existing mail boxes, drainage culverts, clothes line posts, fences and the like shall not be damaged or disturbed unless necessary, in which case, they shall be replaced in as good condition as found as quickly as possible. Existing materials shall be reused in replacing such facilities when materials have not been damaged by the Contractor's operations. Existing facilities damaged by Contractor's operation shall be replaced with new materials of the same type at the Contractor's expense. Work in this category is not a pay item.

B. Replacement of paved drainage ditches within highway right-of-way shall be accomplished in accordance with Department of Transportation specifications.

3.12 PORTLAND CEMENT CONCRETE DRIVEWAY REPLACEMENT

A. Wherever Portland cement concrete driveways are removed, they shall be reconstructed to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than existed prior to the operation.

B. The existing concrete paving shall be sawed or cut to straight edges 12-inches outside the edges of the trench or broken out to an existing joint, as directed by the Engineer. The concrete pavement shall be equal to the existing pavement thickness but not less than 6-inches in thickness for driveways.

C. Pavement shall be reinforced with 6 x 6 #10-10 wire mesh and shall be constructed with 3000 psi concrete.

3.13 RIP-RAP STREAM BANK SLOPE PROTECTION

A. The Contractor shall install rip-rap stream bank slope protection at locations directed by the Engineer. Rip-rap slope protection shall be 12-inches thick and shall meet State D.O.T. Standard Specifications.

3.14 TESTING

A. All pressure piping (lines not laid to grade) shall be given a hydrostatic test to the rated working pressure of the pipe, under which leakage shall not exceed 10 gallons per 24 hours per inch of diameter per mile of pipe. Loss of water pressure during test shall not exceed 10 psi in a 24 hour period, 5 psi in a 10 hour period or, 0 psi in a 4 hour period.

B. Leakage in pipelines, when tested under pressure of 50 psi excess of normal operating pressure, shall not exceed 10 gallons per 24 hours per inch of diameter per mile of pipe.

C. Contractor shall furnish a recording gauge and water meter for measuring water used during leakage test and recording pressure charts during duration of test. Recording pressure charts shall be turned over to the Engineer at conclusion of tests. The pressure recording device shall be suitable for outside service, with a range from 0-200 psig, 24-hour spring wound clock, designed for 9-inch charts, and shall be approved by the Engineer. For Contractor's information only, such pressure recording devices may be available from the Foxboro Company, Foxboro, Massachusetts; Bristol Division of ACCO, Waterbury, Connecticut; or Weksler Instruments Corporation, Freeport, New York.

D. Pipelines shall be tested before backfilling at joints except where otherwise required by necessity or convenience.

E. Duration of test shall be not less than four (4) hours where joints are exposed and not less than 24 hours where joints are covered.

F. Where leaks are visible at exposed joints and/or evident on the surface where joints are covered, the joints shall be laid and leakage must be minimized, regardless of total leakage as shown by test.

G. All pipe, fittings, valves, and other materials found to be defective under test shall be removed and replaced at no additional expense to the Owner.

H. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with.

I. Where nonmetallic joint compounds are used, pipelines should be held under normal operating pressure for at least three days before testing.

J. The Owner will provide initial water for testing the pressure piping. Should the first test fail to pass, all additional water required for subsequent tests shall be furnished at the Contractor's expense.

K. The cost of testing of pressure piping is incidental and is to be included in the Contractor's unit Contract Price.

3.15 DISINFECTION OF POTABLE WATER LINES

A. The new potable waterlines shall not be placed in service--either temporarily or permanently--until they have been thoroughly disinfected in accordance with the following requirements and to the satisfaction of the Engineer.

B. After testing, a solution of hypochlorite using HTH or equal shall be introduced into the section of the line being disinfected sufficient to insure a chlorine dosage of at least 50 ppm in the main. While the solution is being applied, the water should be allowed to escape at the ends of the line until tests indicate that a dosage of at least 50 ppm has been obtained throughout the pipe. Open and close all valves and cocks while chlorinating agent is in the piping system. The chlorinated water shall be allowed to remain in the pipe for 24 hours, after which a residual of at least 25 ppm shall be obtained. The disinfection shall be repeated until 25 ppm is obtained after which time the main shall be thoroughly flushed until the residual chlorine content is not greater than 1.0 ppm, and then may be connected to the system. Also, no additional payment will be allowed for providing taps for chlorine injection and/or flushing, if necessary. The Contractor is responsible for the disposal of highly chlorinated water flushed from the main.

C. After final flushing and before the water main is placed in service, two (2) consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. At least one (1) set of samples shall be collected from every 1,200 feet of the new water main, plus one set from the end of the water main, and at least one set from each branch. All samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and shall show the absences of coliform organisms. A standard plate count may be required at the option of the Engineer.

D. The costs associated with the testing of water samples by an independent testing facility shall be borne by the Contractor. The water samples shall be shipped to the testing facility under the direct supervision of the resident project representative and/or the Owner.

3.16 CONNECTION TO EXISTING SYSTEM

A. Unless otherwise directed by the Engineer, the Contractor shall connect the new water main to the existing water system. The Contractor must notify the Utility when the connection is to be made so that representatives of the Utility may operate existing valves and witness the connection. A minimum notice of 24 hours must be given.

3.17 CLEAN UP

A. Upon completion of installation of the piping and appurtenances, the Contractor shall remove all debris and surplus construction materials resulting from the Work. The Contractor shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line.

END OF SECTION

SECTION 02515 - VALVES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required to furnish and install all valves shown on the Drawings and/or specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

B. Piping is specified in Division 2 Specification sections.

1.03 SUBMITTALS

A. Descriptive literature, catalog cuts, and dimensional prints clearly indicating all dimensions and materials of construction, shall be submitted on all items specified herein to the Engineer for review before ordering. Comply with provisions of Section 01340.

B. At the time of submission, the Contractor shall, in writing, call Engineer's attention to any deviations that the submittals may have from the requirements of the Engineer's Contract Drawings and Specifications.

PART 2 - PRODUCTS

2.01 GATE VALVES

A. Gate valves smaller than 4" shall conform with AWWA C-500 standard, and shall be of the double disc type, iron body, fully bronze mounted, non-rising stem and have a design working pressure of 200 psi. Valves shall be of standard manufacturer and of the highest quality both as to materials and workmanship.

B. Gate valves 4" and larger shall conform with AWWA C-509 standard, and shall be of the resilient seat type, iron body, fully bronze mounted, non-rising stem and have a design working pressure of 200 psi. Valves shall be of standard manufacturer and of the highest quality both as to materials and workmanship.

C. All gate valves shall be furnished with mechanical joint connections, unless otherwise shown on the Drawings or specified hereinafter.

D. An epoxy coating conforming to AWWA C-550 shall be applied to the interior and exterior ferrous surfaces of the valve except for finished or seating surfaces.

E. 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 water pressure cast on the body of the valve.

F. Each gate valve shall be installed in a vertical position with a roadway type valve box. Gate valves set with valve boxes shall be provided with a 2-inch square operating nut and shall be opened by turning to the left (counter-clockwise). There shall be a maximum 48" depth of valve operating nut. Contractor must use extension stems, if necessary, to raise operator nut within 48" of final grade.

2.02 VALVE BOXES - BURIED VALVES (EXCEPT AIR RELEASE AND SEWAGE COMBINATION VALVES)

A. Valve boxes shall be of 5-1/4 inch standard cast iron, two-piece, screw type valve box with drop cover marked "WATER", "SEWER", "DRAIN", as applicable. Valve boxes for gate valves larger than 8 inches shall be three-piece. Valve boxes shall be accurately centered over valve operating nut, and backfill thoroughly tamped about them. Valve boxes shall not rest on the valves but shall be supported on crushed stone fill. They shall be set vertically and properly cut and/or adjusted so that the tops of boxes will be grade in any paving, walk or road surface, and 2 to 3 inches above finish grade in grass plots, fields, woods or other open terrain. In grass areas, provide concrete pad around valve box; slightly crown in all directions to shed water. Valve boxes and covers shall be as manufactured by Tyler Corporation, Opelika Foundry or equal.

B. Contractor shall furnish two (2) 6-foot T-handle operating wrenches for underground valves. Nut operator extensions for all valves buried deeper than 3 feet shall be provided with stem extensions sufficient to raise operator nut to within 3 feet of finished grade.

C. Circular hi-density polyethylene boxes shall be as manufactured by Mid-States Company, Lexington, Kentucky; Tallman Conduit Company, Louisiana, Missouri; or equal, size as indicated on Drawings. Covers shall be solid one-piece flat lids, sized to fit box, as manufactured by Charlotte Pipe and Foundry, or equal.

D. Valve boxes inside a paving, walk, or road surface shall not be set on the valves but shall be supported on crushed stone fill.

E. Wherever valve boxes fall outside of the roadway pavement, the top of the box shall be set in a concrete slab 18” x 18” x 6” thick (or 18” circular x 6” thick) with the top of the slab and box flush with the top of the ground. This provision shall apply to all new and all existing valve boxes which fall within the limits of the contract, unless otherwise stated on the plans or ordered by the Engineer.

2.03 TAPPING SLEEVES AND VALVES

A. Tapping sleeves for connections to existing water lines shall be extra heavy stainless steel type suitable for working pressures of 150 psi and shall be Dresser Style 630, or equal.

B. Tapping Valves:

1. Tapping valves shall be of the mechanical joint type suitable for working pressures of 200 psi and shall be Mueller No. T-2360, American Valve and Hydrant No. 565, M & H No. 4751, or equal, for taps up to 12” diameter.

2. Tapping valves for taps larger than 12” diameter shall be of the mechanical joint type suitable for working pressure of 250 psi and shall be American Flow Control Series 2500, Mueller No. T-2361, or equal, and shall be side mounted with geared actuator.

C. All existing water mains to be tapped under this contract shall be exposed in order to verify line sizes and cover over the lines prior to ordering tapping sleeves and valves.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All valves shall be installed in accordance with details on the Contract Drawings and with the manufacturer's recommendations.

B. All valves shall be anchored in accordance with the details on the Contract Drawings.

END OF SECTION

SECTION 02517 - HYDRANTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required for furnishing and installing all hydrants and appurtenances specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02300

B. Valves - Utilities Services: Section 02515

C. Water Distribution Piping: Section 02510

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01340 of this specification.

B. Descriptive literature, catalog cuts, and dimensional prints clearly indicating all dimensions and materials of construction, shall be submitted on all items specified herein to the Engineer for review before ordering.

C. At the time of submission, the Contractor shall, in writing, call the Engineer's attention to any deviations that the submittals may have from the requirements of the Engineer's Contract Drawings and Specifications.

PART 2 - PRODUCTS

2.01 FIRE HYDRANTS

A. The Contractor shall furnish and install fire hydrants and auxiliary gate valves where shown on the Drawings or directed by the Engineer. Hydrants shall conform in all respects to the most recent requirements of AWWA C502. Hydrant barrel shall have safety breakage feature above the ground line. All hydrants shall have 6-inch mechanical joint shoe connection, two (2) 2-1/2-inch discharge nozzles, and one (1) 4 1/2-inch pumper nozzle with rubber gasketed caps fitted with cap chains. Cap nuts are to be five (5) sided. Connection threads shall be National Standard Thread. Main valve shall have 5-1/4-inch full opening and be of the compression type opening against water pressure so that valve remains closed should barrel be broken off.

B. Hydrants shall be fully bronze mounted. Main valve shall have a threaded bronze seat ring assembly of such design that it is easily removable by unscrewing from a threaded bronze drain ring. Bronze drain ring shall have multiple ports providing positive automatic drainage as the main valve is opened or closed. Drainage waterways shall be completely bronze to prevent rust and corrosion.

C. The operating nut shall be five (5) sided bronze or bronze with a five (5) sided ductile iron cap, and mounted so that a counter clockwise motion will open the valve. There must be cast on top an arrow and the word “Open” indicating the direction of turn to open the hydrant.

D. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stop shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir protected from weather and the waterway with O-ring seals.

E. Hydrants shall be shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.

F. Type of shoe connection shall be mechanical joint and size shall be six inches (6").

G. Hydrants shall be given two (2) coats of enamel high visibility paint to be selected by the Owner.

H. Hydrants shall be Mueller Super Centurion Model A-423, or approved equal.

PART 3 - EXECUTION

3.01 SETTING OF FIRE HYDRANTS

A. Location:

1. Hydrants shall be located as shown or as directed so as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

2. When placed behind the curb, the hydrant barrel shall be set so that the pumper or hose nozzle cap will be a minimum of five feet (5') from the back of curb.

3. When set in the lawn space between the curb and the sidewalk or between the sidewalk and the property line, no portion of the hydrant or nozzle cap shall be within six inches (6") of the sidewalk.

B. Position:

All hydrants shall be set plumb with not less than two (2) cubic feet of crushed stone and shall have their nozzles parallel with the roadway, with the pumper nozzle facing toward the roadway. Hydrants shall be set to the established grade, with nozzles at least eighteen inches (18") above the ground, as shown or as directed by the Engineer.

C. Connection to Main:

Each hydrant shall be connected to the main with a six-inch (6") restrained joint ductile iron branch controlled by an independent six -inch (6") gate valve, unless otherwise specified.

D. Hydrant Drainage in Pervious Soil:

Whenever a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing uncrushed course aggregate (AAHSTO M-43) No. 57 from the bottom of the trench to at least six inches (6") above the drain opening in the hydrant and to a distance of one foot (1') around the elbow. No drainage system shall be connected to a sewer.

E. Hydrant Drainage in Impervious Soil:

Whenever a hydrant is set in clay or impervious soil, a drainage pit two feet (2') in diameter and three feet (3') deep shall be excavated below each hydrant and filled compactly with uncrushed course aggregate (AASHTO M-43) No. 57 under and around the elbow of the hydrant and to a level of six inches (6") above the drain opening. No drainage pit shall be connected to a sewer (see Standard Details).

3.02 ANCHORAGE

A. The bowl of each hydrant shall be tied to the pipe with suitable anchor couplings, as shown on the Standard Details in the Drawings or as directed by the Owner or Engineer.

3.03 FIRE HYDRANT WRENCHES

A. One (1) hydrant wrench shall be furnished for each ten (10) hydrants or less. When the number of hydrants furnished and installed exceeds twenty-five (25), one (1) hydrant repair kit shall be supplied at no additional cost to the Owner.

END OF SECTION

SECTION 02530 - GRAVITY SEWER PIPING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required for furnishing and installing all piping and appurtenances as shown on the Drawings and specified herein.

B. Contractor shall note that the construction of the new sewer will be performed in close proximity to other active utilities, both above and below grade. The Contractor shall include in his pay item any associated cost for working around other utilities. This shall include any cost for loss in production, temporary supports, temporary bracing and/or the use of trench boxes. The Contractor shall coordinate this work with the other utility as required.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A.	Earthwork:	Section 02300
B.	Boring and Jacking:	Section 02400
C.	Sanitary Sewer Manholes, Frames and Covers:	Section 02532
D.	Excavation Support and Protection:	Section 02260

1.03 SUBMITTALS

A. Submit manufacturer’s data as specified herein. Comply with all requirements of Section 01340.

1.04 INTERNAL PIPE DIAMETER

A. All sewer pipe provided shall have a minimum actual internal diameter which is equal to or greater than the diameter indicated on the Contract Drawings.

PART 2 - PRODUCTS

2.01 GRAVITY SEWER PIPE

A. Polyvinyl Chloride (PVC) Pipe and Fittings

PVC Pipe shall be installed where indicated on the Contract Drawings. PVC pipe shall not be used in locations where the depth of cut is greater than 16 feet.

1. Gravity Sewer Application (15" and Smaller):

a. PVC pipe used for gravity sewer applications shall meet all requirements

of ASTM Specification D-3034, latest revision. Pipe and fittings shall meet the extra strength minimum of SDR-35 of that Specification.

b. All pipe and fittings shall be inspected at the factory and on the job site. Testing of PVC pipe and fittings shall be accomplished in conformance with the latest revision of ASTM D3034, ASTM D2444, ASTM D2412, and ASTM D2152. The manufacturer shall submit five (5) copies of certification of test for each lot of material represented by shipment to the job site.

c. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform in color as commercially practical. PVC pipe shall have a ring painted around spigot ends in such a manner as to allow field checking of setting depth of pipe in the socket.

d. Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical. Pipe shall not be stored outside where subject to sunlight.

e. Jointing of PVC pipe shall be by a natural rubber ring inserted into the belled end of the pipe or double hub joints. Solvent weld joints are not acceptable.

f. The PVC pipe manufacturer shall provide special fittings, acceptable to the Engineer to make watertight connections to manholes.

g. Pipe manufacturer shall furnish notarized certificate of compliance with applicable specifications.

2.02 COMPRESSION COUPLINGS

A. When joining different types of pipe together or new pipe to existing pipe, the Contractor shall use Fernco Compression Couplings, or equal, that are resistant to corrosion by soil and sewage and that will provide a permanent watertight joint.

B. The compression coupling shall meet the physical test and joint-leak requirements specified in ASTM C425. The bands for attaching pipes shall be stainless steel conforming to ASTM C425. Each coupling shall bear the manufacturer's name and an indication of its size.

2.03 CONCRETE PIPE ANCHORS

A. Where indicated on the Drawings, required by the specifications or as directed by the Engineer, concrete pipe anchors shall be installed. Concrete shall be 2000 psi, and reinforcing bars shall be as indicated on the anchor detail.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine Areas to Receive Piping For:

1. Defects such as weak structural components that adversely affect execution and quality of Work.

2. Deviations beyond allowable tolerances for piping clearances.

B. Start Work only when conditions are corrected satisfactorily.

3.02 EXCAVATION FOR PIPELINE TRENCHES

A. Unless otherwise directed by the Engineer, trenches in which pipes are to be laid shall be excavated in open cut to the depths required by field conditions or as specified by the Engineer. In general this shall be interpreted to mean that machine excavation in earth shall not extend below an elevation permitting the pipe to be properly bedded. Installation shall be in accordance with ASTM-D-2321 except as modified herein.

B. Excavation may be undercut to a depth below the required invert elevation that will permit laying the pipe in a bed of granular material to provide continuous support for the bottom quadrant of the pipe. When this method is used, the bedding shall be as set out in Paragraph 3.02 hereinafter.

C. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe, but unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider then 2'-0" plus the nominal diameter of the pipe at the level of or below the top of the pipe. If the trench does become wider than 2'-0" at the level of or below the top of the pipe, special precaution may be necessary, such as providing compacted, granular fill up to top of the pipe or providing pipe with additional crushing strength as determined by the Engineer after taking into account the actual trench loads that may result and the strength of the pipe being used. The Contractor shall bear the cost of such special precautions as are necessary.

D. All excavated materials shall be placed a minimum of two feet (2') back from the edge of the trench.

E. Before laying the pipe, the trench shall be opened far enough ahead to reveal obstructions that may necessitate changing the line or grade of the pipeline.

F. The trench shall be straight and uniform so as to permit laying pipe to lines and grades given by the Engineer. It shall be kept free of water during the laying of the pipe and until the pipeline has been backfilled. Removal of trench water shall be at the Contractor's expense. Dry conditions shall be maintained in the excavations until the backfill has been placed. During the excavation, the grade shall be maintained so that it will freely drain and prevent surface water from entering the excavation at all times. When directed by Engineer, temporary drainage ditches shall be installed to intercept or direct surface water which may affect work. All water shall be pumped or drained from the excavation and disposed of in a suitable manner without damage to adjacent property or to other work.

G. Minimum cover of 42" shall be provided for all pipelines.

3.03 PIPE BEDDING

A. All sewer pipe shall be supported on a bed of granular material. In no case shall pipe be supported directly on rock. Bedding shall not be a separate pay item unless otherwise set out in the Detailed Specifications. Bedding shall be provided in earth bottom trenches, as well as rock bottom trenches. Bedding material shall be free from rock, foreign material, frozen earth, and be acceptable to the Engineer. Bedding shall be a minimum of 6" below pipe barrel, and extend the springline (horizontal center line) of the pipe.

B. In all cases the foundation for pipes shall be prepared so that the entire load of the backfill on top of the pipe will be carried on the barrel of the pipe and insofar as possible where bell and spigot pipe is involved so that none of the load will be carried on the bells.

C. The granular bedding shall be placed up to at least the spring line (horizontal center line) of the pipe. The bedding material and procedures shall conform to ASTM D 2321 and any Technical Specifications set out hereinafter. If conditions warrant, the Engineer may require the bedding to be placed above the springline of the pipe. Granular bedding shall be Size #9-m or ASTM C 33, Size #7 crushed stone, fine gravel, or sand, and is not a separate pay item.

D. Where undercutting and granular bedding are involved the undercutting shall be of such depth that the bottom of the bells of the pipe will be at least three inches above the bottom of the trench as excavated. Undercutting is not a separate pay item.

E. In wet, yielding mucky locations where pipe is in danger of sinking below grade or floating out of line or grade, or where backfill materials are of such a fluid nature that such movements of the 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. When ordered by the Engineer, yielding and mucky materials in subgrades shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe. Crushed stone or other such granular material, if necessary, as determined by the Engineer to replace poor subgrade material, shall be a separate pay item and classified as "Special Pipe Bedding". Removal of poor material is not a separate pay item.

F. Installation shall be in accordance with ASTM D 2321 except as modified hereinafter.

3.04 SPECIAL PIPE BEDDING

A. Granular material for "Special Pipe Bedding" where required shall be Kentucky Department of Transportation crushed limestone, Size #9.

3.05 LAYING PIPE

A. The laying of pipe in finished trenches shall be commenced at the lowest point so the spigot ends point in the direction of flow.

B. All pipes shall be laid with ends abutting and true to line and grade as given by the Engineer. Supporting of pipes shall be as set out hereinbefore under "Pipe Bedding" and in no case shall the supporting of pipes on blocks be permitted.

C. Before each piece of pipe is lowered into the trench, it shall be thoroughly inspected to insure its being clean. Each piece of pipe shall be lowered separately unless special permission is given otherwise by the Engineer. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, they 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.

D. Pipe shall not be laid on solid rock. A pad of granular material as specified in Paragraph 3.02 "Pipe Bedding", shall be used as a pipe bedding. Pipe bedding is not a separate pay item. Irregularities in subgrade in an earth trench shall be corrected by use of granular material.

E. When ordered by the Engineer, unsuitable materials in subgrades shall be removed below ordinary trench depth in order to prepare a proper bed for the pipe.

F. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood or fabricated plug fitted into the pipe bell, so as to exclude earth or other material, and precautions taken to prevent flotation of pipe by runoff into trench.

G. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has had an opportunity to make an inspection of the joints, alignment and grade, in the section laid.

3.06 BACKFILLING PIPELINE TRENCHES

A. Backfilling of pipeline trenches shall be accomplished as shown on the Drawings and with the requirements set forth in Section 02300 “Earthwork”. Before final acceptance, the Contractor will be required to level off all trenches or to bring the trench up to grade. The Contractor shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction. In the event that pavement is not placed immediately following trench backfilling in paved areas, the Contractor shall be responsible for maintaining the trench surface in a level condition at proper pavement grade at all times.

B. Method "1" - Backfilling in Open Terrain (outside State’s R.O.W.).

Backfilling of pipeline trenches in open terrain, outside the State’s R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench, from the pipe bedding to a point 12" above the top of the pipe, shall be backfilled with No. 9 crushed stone. This material shall be placed in a manner approved by the Engineer, and shall be carefully compacted to avoid displacement of the pipe.

2. The upper portion of the trench above the compacted portion shall be backfilled with material which is free from large rock. Incorporation of rock having a volume exceeding one-half cubic foot is prohibited. Backfilling this portion of the trench may be accomplished by any means approved by the Engineer. The trench backfill shall be heaped over or leveled as directed by the Engineer.

C. Method "2" - Backfilling in open areas (inside State's R.O.W.).

Backfilling of pipeline trenches in open areas inside State's R.O.W. shall be accomplished in the following manner.

1. The lower portion of the trench, from the pipe springline (horizontal center) to a point 6" below the grade line, shall be backfilled with No. 9 crushed stone. This portion of the trench shall be wrapped with geotextile fabric per Section 02300 and the Standard Detail Drawings.

2. The top 6" of trench shall be backfilled with heaped backfill, free of rock, with mechanical tamping. However, should this occur at an existing sidewalk or driveways the upper portion of the trench shall be temporarily backfilled and maintained with crushed stone or gravel until such time as the sidewalk is constructed or the driveway surface is restored.

D. Method "3" – Backfilling Under Streets, Roads, and Paved Driveways (inside State R.O.W.).

Backfilling of pipeline trenches under streets, roads and paved driveways (inside State R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench, from the pipe bedding to a point 12 inches above the top of the pipe, shall be backfilled with No. 9 crushed stone. This material shall be placed in a manner to avoid displacement of the pipe.

2. The middle portion of the trench, from a point 12" above the top of the pipe to a point even with the bottom of the existing pavement shall be backfilled with flowable fill per Section 02300 and the Standard Detail Drawings.

E. Method "4" - Backfilling Under Streets, Roads, and Paved Driveways (outside the State's R.O.W.):

Backfilling of pipeline trenches under streets, roads and paved driveways(outside State's R.O.W.) shall be accomplished in the following manner:

1. The lower portion of the trench from the pipe bedding to a point 6" below the bottom of the pavement or concrete sub-slab, shall be backfilled with No. 9 crushed stone.

2. The upper portion of the trench, from a point 6" below the bottom of the pavement or concrete sub-slab to grade, shall be backfilled with a base course of dense graded aggregate. At such time that pavement replacement is accomplished, the excess base course shall be removed as required.

F. All backfilling methods are shown on the Detail Drawings. When directed by the Engineer, the Contractor shall wet backfill material to assure maximum compaction.

Before final acceptance, the Contractor will be required to level off all trenches or to bring the trench up to grade. The Contractor shall also remove from roadways, rights-of-ways and/or private property all excess earth or other materials resulting from construction.

In the event that pavement is not placed immediately following trench backfilling in streets and highways, the Contractor shall be responsible for maintaining the trench surface in a level condition at proper pavement grade at all times.

3.07 SETTLEMENT OF TRENCHES

A. Whenever lines are in, or cross, driveways and streets, the Contractor shall be responsible for any trench settlement that occurs within these rights-of-way within one year from the time of final acceptance of the work. If paving shall require replacement because of trench settlement within this time, it shall be replaced by the Contractor at no extra cost to the Owner. Repair of settlement damage shall meet the approval of the Owner and/or the State Department of Transportation.

3.08 CONCRETE CRADLE, ANCHORS OR ENCASEMENT

A. Concrete cradle, anchors or encasement shall be placed where shown on the Drawings, required by the specifications, or as directed by the Engineer.

B. Concrete shall be 2000 psi and shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed. In tamping concrete, care shall be taken not to disturb the grade or line of the pipe or injure the joints. Concrete placed outside the specified limits or without authorization from the Engineer will not be subject to payment.

3.09 BITUMINOUS CONCRETE HIGHWAY, STREET AND DRIVEWAY REPLACEMENT DUE TO UTILITY LINE CONSTRUCTION

A. The Contractor shall replace those sections of existing roads, streets and driveways required to be removed to install the pipe lines under this contract. He shall construct same to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to the operations.

B. Prior to trenching, the pavement shall be scored or cut to straight edges at least twelve (12) inches outside each edge of the proposed trench to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be re-cut and trimmed to square, straight edges after the pipeline has been installed and prior to placing the new base and pavement.

C. Backfilling of the trench shall be in accordance with Method "3" or “4” as described hereinbefore. Base course for the paving shall be dense graded crushed limestone furnished and placed in accordance with the current requirements of Section 303 of the Standard Specifications for Road and Bridge Construction of the Kentucky Department of Transportation, to a depth of six (6) inches in roads and streets and four (4) inches in driveways, unless flowable fill is required.

D. A subslab of reinforced concrete shall be placed for state maintained highways as indicated on the Drawings. The subslab shall have a minimum thickness of 6 inches. Concrete for the subslab shall be 2500 psi, in accordance with the Details shown on the Drawings.

E. The Contractor installing the utilities shall be responsible for installing 2” of asphalt base course flush with the existing grade. The General Road Contractor shall overlay this area with surface per their road paving specifications.

F. Prior to placing the bituminous binder course, the granular base course shall be thoroughly cleaned and broomed and a prime coat of Refined Tar RT-2 shall be uniformly applied at the rate of 0.35 gallons per square yard.

G. The bituminous base course shall be hot mixed, hot laid, bituminous concrete base, furnished and placed in accordance with Section 402 of the Standard Specifications, and to match the existing depth or to a minimum compacted thickness of 2 inches.

H. The surface course shall be hot mixed, hot laid, bituminous concrete, furnished and placed in accordance with the Roadway Standard Specifications.

3.10 GRAVITY SEWER CONNECTION OF NEW SANITARY SEWER TO EXISTING MANHOLES

A. New sanitary sewer shall be extended through the wall of the existing manhole, a grout ring installed, sealed and patched with an expansive cement mortar and pipe sealed with a test plug. Test plug shall be a wing nut style as manufactured by Richmond Foundry, Richmond, Virginia, or equal. Apron and invert shall be removed in its entirety where required to allow placement of the new sewer at the specified invert elevation.

B. At the time the new sewer is placed into permanent service, as designated by the Owner, the Contractor shall remove the old sewer pipe from the manhole, patch and seal the wall with an expansive cement mortar, construct new apron and invert in accordance with the standard details, and remove plug from the new sewer. All temporary pumping, piping, excavation, etc. as required to maintain or divert the sewage flow shall be included by the Contractor.

3.11 CONNECTIONS TO EXISTING SEWER

A. Connection to Existing Lines: The Contractor shall provide all labor and materials required in connecting the newly constructed sanitary sewers to an existing sewer main. A representative of the Utility must be present while the connection is being made. The Utility should be given at least a 24-hour advance notice before the connection is made.

3.12 CONCRETE CURB AND GUTTER REPLACEMENT

A. The Contractor shall remove the curb and gutter when encountered when required for laying the sewer. Only that portion of the curb and gutter needed to lay the sewer line shall be removed.

B. Where concrete curb and gutter removed or disturbed during the construction work, it shall be replaced, using 3000 psi concrete, in fully as good or better condition than which existed prior to the Contractor's operation.

3.13 REPLACEMENT OF EXISTING MAIL BOXES, CULVERTS, CLOTHES LINE POSTS, FENCES AND OTHER SUCH FACILITIES

A. Existing mail boxes, drainage culverts, clothes line posts, fences and the like shall not be damaged or disturbed unless necessary, in which case, they shall be replaced in as good condition as found as quickly as possible. Existing materials shall be reused in replacing such facilities when materials have not been damaged by the Contractor's operations.

Existing facilities damaged by Contractor's operation shall be replaced with new materials of the same type at the Contractor's expense. Work in this category is not a pay item.

B. Replacement of paved drainage ditches within highway right-of-way shall be accomplished in accordance with Department of Transportation specifications.

3.14 PORTLAND CEMENT CONCRETE DRIVEWAY REPLACEMENT

A. Wherever Portland cement concrete driveways are removed, they shall be reconstructed to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than existed prior to the operation.

B. The existing concrete paving shall be sawed or cut to straight edges 12-inches outside the edges of the trench or broken out to an existing joint, as directed by the Engineer. The concrete pavement shall be equal to the existing pavement thickness but not less than 6-inches in thickness for driveways.

C. Pavement shall be reinforced with 6 x 6 #10-10 wire mesh and shall be constructed with 3000 psi concrete.

3.15 RIP-RAP STREAM BANK SLOPE PROTECTION

A. The Contractor shall install rip-rap stream bank slope protection at locations directed by the Engineer. Rip-rap slope protection shall be 12-inches thick and shall meet State D.O.T. Standard Specifications.

3.16 TESTING

On all projects involving installation of sanitary sewer lines, the finished work shall comply with the provisions listed below or similar requirements which will insure equal or better results:

A. Rod Out: After the collecting and/or outfall lines or system have been brought to completion, and prior to final inspection, the Contractor shall rod out the entire system by pushing through each individual line in the system, from manhole to manhole, appropriate tools for the removal from the lines of any and all dirt, debris and trash.

B. Inspect Lines: During the final inspection, the Engineer will inspect each individual line, from manhole to manhole, either by use of lights or other means at his disposal to determine whether the completed lines are true to line and grade as laid out or as shown on the plans.

C. Ball Test: The Engineer will require that the Contractor pass through the system under its own momentum a wooden ball of a diameter one-inch less than the nominal diameter of the pipe, except that no ball larger than eight (8) inches in diameter shall be used.

D. Deflection tests shall be performed on a flexible pipe. The test shall be conducted after the final backfill has been in place at least 30 days to permit stabilization of the soil-pipe system. No pipe shall exceed a deflection of 5 percent. If deflection exceeds 5 percent, pipe shall be replaced or corrected. The rigid ball cylinder or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM Specification, including the appendix, to which the pipe is manufactured. The pipe shall

be measured in compliance with ASTM D2122 Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings. The test shall be performed without mechanical pull devices.

E. Replace Defective Lines: All lines or sections of lines that are found to be laid improperly with respect to line or grade, that are found to contain broken or leaking sections of pipe, or are obstructed in such a manner that they cannot be satisfactorily corrected otherwise, shall be removed and replaced at the Contractor's expense.

F. I & I Limits: The Contractor shall lay sewer lines, including house connections so that the access of ground water or loss of water from the sewer system or other gravity flow piping which does not normally flow full will be limited to 10 gallons per inch diameter per mile per day. This limitation is inclusive of manholes, sewers, house connections, and appurtenances. This requirement may be applied to a portion of the contract work, such as the sewers in a separate drainage area or to a single section of the line between two manholes.

G. Low Pressure Air Test: To test for leaks, the Engineer will require that all completed piping as specified herein after back filling be tested by low-pressure air test, exfiltration, or infiltration test. Should the low pressure air test results be inconclusive, or at the request of the Engineer, an exfiltration or infiltration test will be required on the low pressure air tested segments. Labor, equipment and supplies required for all tests shall be furnished by the Contractor.

The low-pressure air test shall consist of meeting a required holding time during a measured pressure drop. The initial test pressure shall be 4.0 psi, with the allowable pressure loss being 1.0 psi during the calculated holding time. Holding time shall be as indicated in the following table:

SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015*

1 Pipe Dia. (in)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specified Minimum for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46
42	39:48	57	41.883 L	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07
48	45:34	50	54.705 L	91:10	136:45	182.21	227:55	273:31	319:06	364:42	410:17
54	51:02	44	69.236 L	115:24	173:05	230:47	288:29	346:11	403:53	461:34	519:16
60	65:40	40	85.476 L	142:28	213:41	284:55	356:09	427:23	498:37	569:50	641:04

* If there is no leakage (0 psi drop) after one hour of testing, the tested section shall be accepted.

H. Exfiltration Test: In order to test for infiltration the Engineer may also require exfiltration tests on each section of pipe between manholes after it has been laid but prior to back filling of joints. Exfiltration tests shall be conducted by plugging the lower end of the section of sewer to be tested and filling the sewer with water to a point approximately five feet above the invert at the lower end and at least one foot above the pipe at the upper end, observing for leakage at all joints and measuring the amount of

leakage for a given interval of time. Exfiltration shall not exceed 110 percent times the infiltration limits set out hereinbefore. All observed leaks shall be corrected even though exfiltration is within the allowable limits.

I. Infiltration Test: To test for infiltration, the Engineer may also require that the Contractor plug the open ends of all lines at the manhole so that measurements may be made at each section of the sewer line. Infiltration tests shall consist of weir measurement to determine quantities of any infiltration. Measurements shall be taken at line locations directed by the Engineer. This infiltration test will not be made until the sewer line is completed, and the Contractor will be required to correct all conditions that are conductive to excessive infiltration and may be required to relay such sections of the line that may not be corrected even though infiltration is within allowable limits.

J. Smoke testing may be used only to locate leaks and in no case shall be considered conclusive. In all cases the smoke test shall be accompanied by an air test, exfiltration test or infiltration test. Smoke testing may only be performed where ground water is low and smoke is blown into a conduit that is properly sealed. All such leaks or breaks discovered by the smoke tests shall be repaired and/or corrected by the Contractor at his own expense. Equipment and supplies required from smoke tests shall be furnished by the Contractor. The Contractor may also be required to smoke test the first section (manhole-to-manhole) of each size of pipe and type of joint on each construction contract prior to backfilling to establish and check laying and jointing procedures. Other supplementary smoke tests prior to backfilling may be performed by the Contractor at his option; however, any such tests shall not supplant the final tests of the completed work unless such final tests are waived by the Engineer.

3.17 CLEAN UP

A. Upon completion of installation of the piping and appurtenances, the Contractor shall remove all debris and surplus construction materials resulting from the Work. The Contractor shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line.

END OF SECTION

SECTION 02532 - SANITARY SEWER MANHOLES, FRAMES, AND COVERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required for furnishing and installing all manholes and appurtenances specified herein and shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02300

B. Sewage Collection Lines: Section 02530

1.03 SUBMITTALS

A. Submit manufacturer’s data and shop drawings for the materials specified herein. Comply with all requirements of Section 01340.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Upon delivery and before handling, the Contractor must inspect the manhole sections for any damage occurring in transit and note such damage on the delivery ticket.

B. The means by which the manhole sections are unloaded is the decision and responsibility of the Contractor. He should follow recommendations of the manufacturer.

C. The Contractor shall follow manufacturer’s recommendations for storage of manhole sections in order to minimize damage prior to installation.

D. The Contractor shall adhere to the standard procedures given by the manufacturer for handling the manhole sections.

PART 2 - PRODUCTS

2.01 MANHOLES

A. Manholes of the form and dimensions shown on the Drawings shall be constructed of ASTM C 478 precast reinforced concrete manhole sections erected on 3,000 psi concrete foundation.

B. Precast concrete manhole bottom sections may be substituted for "cast-in-place" foundations subject to the Owner’s review.

C. The excavation shall be kept free of water while the manhole is being constructed and the manhole shall not be backfilled until inspected by the Engineer.

D. Standard Manholes:

1. The standard manhole shall be 4' -0" in diameter and not greater than six (6) feet in depth, measured from the top of the cover frame to the invert of the outlet and shall be cone type- top construction as shown on the Drawings.

2. Manholes greater than six (6) feet in depth, measured as above, shall be paid for as a standard six foot manhole, plus the additional vertical depth at the Contract unit price.

E. Shallow Manholes:

The shallow manholes shall be five (5) feet or less in depth, measured from the top of the cover frame to the invert of the outlet and shall be of flat top construction as shown on the Drawings.

F. Concrete Manhole Sections:

1. Circular precast concrete barrel section for wet wells, valve vaults or manholes shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C 76 Class III reinforced concrete pipe, unless otherwise noted on the Drawings.

2. AASHTOM-198-75 performed flexible butyl type joint sealant, Hamilton-Kent "Kent-Seal No. 2", K.T. Snyder Company "Rub'r-Nek", Press Seal Gasket "E-Z Stik," or equal; or joined with bituminous mastic joint sealing compound meeting Kentucky Department of Transportation Specifications 807.02.04. When making joints with mastic compound, prime and seal all joints with primer supplied with the joint compound. Joints shall be watertight.

G. Precast Concrete Eccentric Cones:

Precast concrete eccentric cones shall be of the size and shape shown on the Drawings and shall conform to ASTM C 478.

H. Precast Manhole Section Joints:

Precast manhole section joints shall be jointed with one of the following products:

ASTM C 443 rubber gaskets
AASHTO M-198-75 preformed flexible butyl type joint sealant
Hamilton-Kent "Kent-Seal No. 2"
K.T. Snyder Co. "Rub'r-Nek"
Press Seal Gasket "E-Z stik"
Concrete Sealants, Inc. "Conseal"

or equal, or joined with bituminous mastic joint sealing compound meeting Kentucky Department of Transportation Specifications 807.02.04. When making joints with mastic compound prime and seal all joints with primer supplied with the joint compound. Manhole section joints shall be watertight. These requirements apply to all joints, including manhole risers, cones, and grade rings.

I. Manhole Inverts:

Manhole inverts shall be formed with 3,000 psi concrete. Inverts shall be constructed as shown on the Contract Drawings and shall form a smooth finish. The inverts shall be constructed on site after both inlet and outlet pipes are installed.

J. Manhole Steps

Plastic manhole steps shall be PS1-PF (Press Fit) polypropylene plastic as manufactured by MA Industries, Peachtree City, Georgia or equal. Steps shall be driven into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.

Steps shall be aligned vertically above the outlet, in line with the flow through. Step spacing shall be 15”.

K. Manhole Frames and Covers:

Manhole castings shall consist of cast iron frames with a minimum clear opening of twenty-two (22) inches. Casting shall have a minimum of four (4) bolt holes for the purpose of anchoring the casting to the manhole cone or grade ring.

Manhole covers must set neatly in the rings, with contact edges machined for even bearing and tops flush with ring edge. They shall have sufficient corrugations to prevent slipperiness and be marked in large letters, "SANITARY SEWER". The covers shall have two concealed pick holes. Covers on sanitary sewer manholes shall not be perforated.

Acceptable manufacturers are J.R. Hoe & Sons, Middlesboro, KY; John Bouchard & Sons Co., Nashville, TN; and Neenah Foundry Company, Neenah, WI., or equal.

1. Traffic Weight: Manhole frame and cover weight to be minimum of 325 pounds.

2. Non-Traffic Weight: Manhole frame and cover weight to be minimum of 250 pounds.

L. Watertight Manhole Covers:

Watertight manhole covers shall consist of cast iron frames with machined bearing surfaces, continuous gasket seal preinstalled into slots with dovetail design and shall be of the “Self-Sealing type as manufactured by Neenah Foundry Company or equal. Watertight manhole covers shall have sufficient corrugations to prevent slipperiness and be marked in large letters ”SANITARY SEWER”. Weight of manhole covers shall be as specified in Paragraph 2.01.K of this specification.

M. Pipe Connections Into Manholes:

Sewer pipe shall be sealed in the manhole section pipe openings with a resilient connector meeting the requirements of ASTM C923. Resilient connector shall be PSX: Positive Seal by Press – Seal Gasket Corporation, or equal.

Wherever plastic sewer pipe is to be field grouted into manhole openings, pipe-to-manhole connector seal shall be Fernco Concrete Manhole Adapters manufactured by Fernco, Inc., Division, Michigan, or equal. Adapter shall be mounted on pipe and shall be positioned about the center of the manhole wall.

N. Precast Concrete Manhole Base Sections:

Precast concrete manhole base sections, if provided in lieu of cast-in-place foundations, shall be "monolithic", consisting of base slab, and base riser section. Upon review and approval by the Owner and Engineer, precast base sections may include floor invert channel and apron. All precast base sections with pipe openings shall be furnished with ASTM C 923 pipe-to-manhole connector gaskets, as specified hereinbefore. **Precast base sections shall be furnished with an integral anti-flotation footing, thickness as specified hereinafter, with 6-inch projection, as shown in the Details.** Precast base sections shall be set on a 6-inch deep pad (compacted thickness) of dense graded aggregate, placed to proper elevation and leveled. The Engineer reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the Engineer determines the products unsuitable for the Owner's installation.

Precast concrete manhole base slab thickness shall comply with the following schedule:

0' - 10'	Vertical Height - 6" Slab
10.1' - 15'	Vertical Height - 8" Slab
15.1' - 20'	Vertical Height - 10" Slab
20.1' - 25'	Vertical Height - 12" Slab
25.1' - 30'	Vertical Height - 14" Slab

O. Drop Connections into Manholes

Where indicated on the Drawings, drop connections into manholes shall be installed. Drop connections shall be cast-in-place or precast, and shall conform to the requirements shown on the Details.

2.02 COMPRESSION COUPLINGS

A. When joining different types of pipe together or new pipe to existing pipe, the Contractor shall use Fernco Compression Couplings, or equal, that are resistant to corrosion by soil and sewage and that will provide a permanent watertight joint. The compression coupling shall meet the physical test and joint-leak requirements specified in ASTM C-594. The bands for attaching pipes shall be stainless steel conforming to ASTM C-594. Each coupling shall bear the manufacturer's name and an indication of its size.

2.03 MANHOLE GRADE ADJUSTMENT

A. Adjustments to manholes, whether new or existing as shown on the plans will be made in the following manner:

1. A maximum of 12" total height of concrete grade ring will be allowed.

   All other elevation adjustment must be made by removing or adding complete barrel section in the manner as described in this section.

2. In no case will concrete grade ring diameter be less than manhole frame.

3. Frames of all new or adjusted manholes within highway construction limits will be secured to the manhole cone section by (2) 3/4" diameter anchor bolts, drilled 3" minimum into the cone.

PART 3 - EXECUTION

3.01 EXCAVATION FOR MANHOLE INSTALLATION

A. Unless otherwise directed by the Engineer, excavation in which manholes are to be installed shall be excavated in open cut to the depths required by field conditions or as specified by the Engineer. In general, this shall be interpreted to mean that machine excavation in earth shall not extend below an elevation permitting the manhole to be properly bedded.

B. Excavation may be undercut to a depth below the required invert elevation that will permit installing the manhole on a bed of granular material to provide continuous support for the manhole base. When this method is used, the bedding shall be as set out in Paragraph 3.02 hereinafter.

C. Excavations shall be of sufficient dimensions to provide free working space on all sides of the manhole and to permit proper backfilling around the manhole. All excavated materials shall be placed a minimum of two feet (2') back from the edge of the excavation.

D. The excavation shall be straight and uniform so as to permit installation of the manhole to lines and grades given by the Engineer. It shall be kept free of water during the installation of the manhole and until the manhole has been backfilled. Removal of water shall be at the Contractor's expense. Dry conditions shall be maintained in the excavations until the backfill has been placed. During the excavation, the grade shall be maintained so that it will freely drain and prevent surface water from entering the excavation at all times. When directed by the Owner or the Engineer, temporary drainage ditches shall be installed to intercept or direct surface water which may affect work. All water shall be pumped or drained from the excavation and disposed of in a suitable manner without damage to adjacent property or to other work.

3.02 MANHOLE BEDDING

A. All manholes shall be supported on a bed of granular material. In no case shall manhole be supported directly on rock. Bedding shall not be a separate pay item unless otherwise set out in the Detailed Specifications. Bedding shall be provided in earth bottom excavations, as well as rock bottom excavations. Bedding material shall be free from rock, foreign material, frozen earth, and be acceptable to the Engineer. Bedding shall be a minimum of 6" below manhole base.

B. Granular bedding shall be Size #9-m or ASTM C 33, Size #7 crushed stone, fine gravel, or sand, and is not a separate pay item.

C. Where undercutting and granular bedding is involved it shall be of such depth that the bottom of the manhole will be at least six inches above the bottom of the excavation. Undercutting is not a separate pay item.

D. In wet, yielding, mucky locations where the manhole is in danger of sinking below grade or floating out of line or grade, or where backfill materials are of such a fluid nature that such movements of the pipe and/or manhole might take place during the placing of the backfill, the pipe and/or manhole must be weighted or secured permanently in place by such means as will prove effective. When ordered by the Engineer, yielding and mucky materials in subgrades shall be removed below ordinary excavation depth in order to

prepare a proper bed for the manhole. Crushed stone or other such granular material, if necessary, as determined by the Engineer to replace poor subgrade material, shall be a separate pay item and classified as "Special Pipe Bedding". Removal of poor material is not a separate pay item.

3.03 SPECIAL BEDDING

A. Granular material for ”Special Bedding” shall be Department of Transportation crushed limestone, Size No. 9.

3.04 BITUMINOUS CONCRETE HIGHWAY, STREET AND DRIVEWAY REPLACEMENT

A. The Contractor shall replace those sections of existing roads, streets and driveways required to be removed to install the pipelines and manholes under this Contract. He shall construct same to the original lines and grades and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to the operations.

B. Prior to excavating, the pavement shall be scored or cut to straight edges at least twelve (12) inches outside each edge of the proposed excavation to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be re-cut and trimmed to square, straight edges after the manhole has been installed and prior to placing the new base and pavement.

C. Backfilling of the excavation shall be in accordance with Method "3" or “4” as described hereinbefore. Base course for the paving shall be dense graded crushed limestone furnished and placed in accordance with the current requirements of the Standard Specifications for Road and Bridge Construction of the Department of Transportation, to a depth of six (6) inches in roads and streets and four (4) inches in driveways, unless flowable fill is required.

D. A subslab of reinforced concrete shall be placed for state maintained highways as indicated on the Drawings. The subslab shall have a minimum thickness of 6 inches. Concrete for the subslab shall be 2,500 psi, in accordance with the Details shown on the Drawings.

E. Bituminous Concrete Surface and Bituminous Concrete Base shall conform to the requirements of Sections 402 and 403 of the Standard Specifications for Road and Bridge Construction of the Department of Transportation.

3.05 REMOVING AND REPLACING CONCRETE CURB AND GUTTER

A. The Contractor shall remove the curb and gutter when encountered when required for installing the manhole. Only that portion of the curb and gutter needed to install the manhole shall be removed. Where concrete curb and gutter removed or disturbed during the construction work, it shall be replaced, using 3,000 psi concrete, in fully as good or better condition than which existed prior to the Contractor's operation.

3.06 REPLACEMENT OF EXISTING MAIL BOXES, CULVERTS, CLOTHES LINE POSTS, FENCES AND OTHER SUCH FACILITIES

A. Existing mail boxes, drainage culverts, clothes line posts, fences and the like shall not be molested or disturbed unless necessary, in which case, they shall be replaced in as good condition as found as quickly as possible. Existing materials shall be reused in replacing such facilities when materials have not been damaged by the Contractor's operations. Existing facilities damaged by Contractor's operation shall be replaced with new materials of the same type at the Contractor's expense. Work in this category is not a pay item.

B. Replacement of paved drainage ditches within highway right-of-way shall be accomplished in accordance with Department of Transportation specifications.

3.07 MANHOLE FRAME INSTALLATION

A. The manhole frame casting shall be centered over the opening in the cone or grade ring of the manhole, with a bituminous mastic joint sealing compound applied between the concrete and the casting.

B. The frame shall be bolted to the cone or grade ring with wedge anchors.

3.08 TESTING

This specification shall govern the vacuum testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the Owner, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the Owner.

A. Manholes shall be tested after installation with all connections in place.

1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.

2. Drop connections shall be installed prior to testing.

3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.

4. The manholes shall be backfilled and finished to design grade.

B. Test Procedure:

1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.

2. The test head shall be placed inside the frame at the tope of the manhole and inflated, in accordance with the manufacturer's recommendations.

3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.

4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.

5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

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

6. If a manhole fails the vacuum test, the manhole shall be repaired with a non-shrinkable grout or other suitable material based on the material of which the manhole is constructed and retested, as stated above.

7. All temporary plugs and braces shall be removed after each test.

Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

3.09 CLEAN UP

A. Upon completion of installation of the manholes and appurtenances, the Contractor shall remove all debris and surplus construction materials resulting from the Work. The Contractor shall grade the ground around and adjacent to the construction area in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line.

END OF SECTION

SECTION 02713 - WATER SERVICES

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall furnish, all meter sets, meter boxes, and meter box rims and tops as required for installation of water services.

B. All labor, equipment and other necessary supplies need to connect water services at locations shown on Drawings, or as directed by the Engineer, shall be furnished by the Contractor.

1.02 RELATED WORK DESCRIBED IN OTHER SECTIONS:

A. Excavation, Backfill and Compaction: Section 02300

B. Steel Casing Pipe: Section 02400

PART 2 - PRODUCTS

2.01 SERVICE SADDLES

A. Service saddles used for attaching service connections to water pipe should have an outlet thread compatible with corporation stop employed. The service saddle shall provide full support around the circumference of the pipe, providing a bearing area of sufficient width to ensure that the pipe will not distort when the saddle is tightened.

B. Service saddles shall be Mueller Model H16123, H16130, H16134, Ford Model F10l or F202; or approved equal.

2.02 COUPLINGS

A. All couplings shall be compatible with the type of service piping used. Couplings shall be as manufactured by Mueller Company, Ford Meter Box Company, C-44-33, C44-44 or approved equal.

2.03 CORPORATION STOPS

A. Corporations stops shall conform to the latest revision of AWWA C800, “Thread for Service Line Fittings”. Corporation stops shall be Mueller H-15013, Ford FB 1000, or approved equal.

2.04 CURB STOPS

A. A curb stop shall be installed at the end of every customer service pipe at the customer's property line. Curb stops shall be Mueller Model H- 15172, Ford B4 1-444, or approved equal.

2.05 COPPER METER SETTERS

A. 5/8"x3/4" meter setters shall be Ford 70 Series Model No. VB HH72-7W-11-33-DL.

B. 1" meter setters shall be Ford 70 Series Model VB HH74-10W-11-44-TV.

C. 2" meter setters shall be Mueller Model B-2423-2.

D. Large diameter water meters shall be as detailed on the Contract Drawings.

2.06 WATER METERS

A. Water meters are to be manufactured by Sensus Metering Systems, Model SR, DR, or equal and comply with ANSI/AWWA Standard C700.

B. Meters shall read in cubic feet.

C. Large diameter water meters shall be as detailed on the Contract Drawings.

2.07 METER BOXES

A. Regular Duty – 15", 24" and 36" diameter PVC for 5/8", 1" and 2" meters with a lid and at the depth required as used by BGMU.

B. Heavy Duty –15", and 24" and 36" minimum diameter concrete box traffic rated as furnished by Brooks Model 36H20 with lid 36 HCL.

PART 3 - EXECUTION

A. All appurtenances necessary for the connection of the water services shall be installed in accordance with the manufacturer's recommendations and as per data contained in "Typical Service Tap".

B. All work will be in accordance with the latest revision of the Kentucky Plumbing Code. The Contractor is responsible for all permits, fees and coordination of work with the State Plumbing Inspector.

END OF SECTION

SECTION 02714 - RECONNECTION OF WATER SERVICES

PART 1 - GENERAL

1.01 GENERAL

A. All material, all labor, equipment and other necessary supplies needed to reconnect water services shall be furnished by the Contractor at locations shown on Drawings, or as directed by the Engineer.

1.02 RELATED WORK DESCRIBED IN OTHER SECTIONS

A. Excavation, Backfill and Compaction: Section 02300

Reconnection of a water service from an existing main to a newly constructed main shall not be accomplished until the newly constructed main has been pressure tested, chlorinated, tested for bacteriological contamination, and has passed the above testing to the satisfaction of the Engineer.

All appurtenances necessary for the reconnection of water services shall be installed in accordance with the manufacturer's recommendations and as per detail "Typical Service Tap".

All work will be in accordance with the latest revision of the Kentucky Plumbing Code. The Contractor is responsible for all permits, fees and coordination of work with the State Plumbing Inspector.

END OF SECTION

SECTION 02920 - LAWNS AND GRASSES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all labor, materials, equipment, and services required for seeding of all disturbed areas caused by construction activities and for installation of sod where indicated on the Contract Drawings or specified herein.

1.02 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this Section.

B. Earthwork: Section 02300

1.03 MAINTENANCE

A. Maintenance shall begin immediately following the last operation of installation for each portion of lawn.

B. Lawns shall be maintained by watering, mowing, and for resodding for a period of forty-five (45) days. At the end of this period an inspection will be made and any deficiencies, which may be attributable to the Contractor, will be noted in writing. At this time, the Owner will assume the maintenance. Another inspection will be made at the beginning of the next planting season, and any of the previously noted deficiencies still existing shall be repaired by the Contractor.

1.04 INSPECTION FOR ACCEPTANCE

A. The Inspection of the Work:

The inspection of the work of lawns to determine the completion of contract work exclusive of the possible replacement of plants, will be made by the Architect/Engineer upon written notice requesting such inspection submitted by the Contractor at least ten (10) days prior to the anticipated date.

B. Acceptance:

After inspection, the Contractor will be notified in writing by the Owner of acceptance of all work of this Section, exclusive of the possible replacement of plants subject to guaranty, or if there are any deficiencies of the requirements of completion of the Work.

PART 2 - PRODUCTS

2.01 WATER

A. Water used in this work shall be suitable for irrigation and free from ingredients harmful to plant life.

B. Hose and other watering equipment required for the Work shall be furnished by the Contractor.

2.02 TOPSOIL

A. The Contractor shall furnish and place sufficient topsoil for the seeding and installation of sod.

2.03 FERTILIZER

A. Commercial fertilizer for lawn areas shall be complete fertilizer, formula 10-10-10, for lawns and shall conform to the applicable state fertilizer laws. Fertilizer shall be uniform in composition, dry and free flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guarantee analysis. Any fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.

B. Fertilizer shall be applied at the rate of 25 pounds per 1,000 square feet.

2.04 GRASS SEED

A. The seed mixture to be sown shall be in the following proportions:

Common Name	Proportion By Weight	% of Purity	% of Germination
Fine Lawn Fescue	40	90	85
Chewings Fescue	25	90	85
Italian Rye Grass	20	90	85
Red Top	10	90	85
White Clover	5	95	90

B. All seed shall be fresh and clean and shall be delivered mixed, in unopened packages, bearing a guaranteed analysis of the seed mixture.

C. Germination must be certified to conform to the following minimums:

Purity	90%
Germination	85%

2.05 SOD

A. Sod shall be at least 70% Bluegrass, strongly rooted and free of pernicious weeds.

B. It shall be mowed to a height not to exceed 3" before lifting, and shall be of uniform thickness with not over 1-1/2" or less than 1" of soil.

2.06 MULCH

A. Mulch for seeded areas shall be Conwed Hydro Mulch, Silva-Fiber, or equal. It shall be suitable for use in a water slurry or for application with hydraulic equipment.

B. Clean straw is acceptable as mulch. It shall be spread at the rate of one (1) bale per 1,000 feet (approximately 2 inch loose depth). Mulch on slopes shall be held in place with erosion control netting.

PART 3 - EXECUTION

3.01 TIME OF PLANTING

A. Planting operations shall be conducted under favorable weather conditions during seasons which are normal for such work as determined by accepted practice in the locality of the project. At the option and on full responsibility of the Contractor, planting operations may be conducted under unseasonable conditions without additional compensation.

3.02 LAWNS

A. Areas to be sodded are designated on the Drawings. All other lawn areas, including areas of cut and fill and where existing ground has been disturbed by construction operations shall be seeded.

B. Fertilizer:

Fertilizer shall be applied at the rate of 25 pounds per 1,000 square feet to the lawn area being prepared for planting and mixed lightly into the top few inches of topsoil. Fertilizer may be mixed with and distributed with grass seed.

C. Planting of Lawns:

1. Sowing of Seed:

Immediately before any seed is to be sown, the ground shall be scarified as necessary, and shall be raked until the surface is smooth, friable and of uniformly fine texture. Lawn areas shall be seeded evenly with a mechanical spreader at the rate of 4 pounds per 1,000 square feet of area, lightly raked, rolled with a 200-pound roller and watered with a fine spray. The method of seeding may be varied at the discretion of the Contractor on his own responsibility to establish a smooth, uniform turf composed of the grasses specified. The sowing of seed shall be done only within the season extending from March 1st to May 15th and from September 1st to October 15th, unless other seasons may be approved by the Owner.

2. Laying of Sod:

Before any sod is laid, all soft spots and inequalities in grade shall be corrected. Fertilizer spread shall be raked in. Sod shall be laid so that no voids occur, tamped or rolled and then thoroughly watered. The complete sodded surface shall be true to finished grade, even and firm at all points. Sodding shall be done only within the seasons extending from March 1st to May 15th and from September 1st to October 15th, unless other seasons may be approved by the Owner.

3. Sod on Slopes:

Sod on slopes 2 to 1 or steeper shall be held in place by wooden pins about 1-inch square and about 6 inches long driven through the sod into the soil until they are flush with the top of the sod, or by other approved methods for holding the sod in place.

4. Mulching:

All seeded areas are to be mulched with Conwed Hydro Mulch, Silva-Fiber, or equal, or with clean straw as specified under PRODUCTS. Mulch shall be applied at the rate of 1,500 pounds per acre. It may be applied with hydraulic equipment or may be added to the water slurry in a hydraulic seeder and the seeding and mulching combined in one operation. Clean straw may be spread by hand to cover the seeded areas at a depth of two (2) inches.

3.03 CLEAN UP

A. All soil, peat or similar material which has been brought over paved areas by hauling operations or otherwise, shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting all excess soil, stone and debris which have not previously been cleaned up shall be removed from the site or disposed of as directed by the Owner. All lawns shall be prepared for final inspection.

3.04 OTHER WORK

A. The Contractor also shall be responsible for the repair of any damage caused by his activities or those of his subcontractors, such as the storage of topsoil or other materials, operations or equipment, or other usages to all on-site areas outside the contract limits. Such repair operations shall include any regrading, seeding or other work necessary to restore such areas to an acceptable condition.

3.05 QUALITY CONTROL

A. Areas seeded shall be protected until a uniform stand develops, when it will be accepted and the Contractor relieved of further responsibility for maintenance. Displaced mulch shall be replaced or any damage to the seeded area shall be repaired promptly, both in a manner to cause minimum disturbance to the existing stand of grass. If necessary to obtain a uniform stand, the Contractor shall refertilize, reseed and remulch as needed. Scattered bare spots up to one (1) square yard in size will be allowed up to a maximum of 10 percent of any area.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and services required to furnish and install all cast-in-place concrete as indicated on the Drawings and specified herein.

B. All concrete construction shall conform to all applicable requirements of ACI 301 (latest), Specifications for Structural Concrete for Buildings, except as modified by the supplemental requirements specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02300

1.03 SUBMITTALS

The Contractor shall submit the following data for Engineer's review in accordance with Section 01340.

A. Concrete mix designs, test results and curves plotted to establish water-cement ratio if ACI 301-99 Section 4.2.3.4.b is followed.

B. Proposed mix designs and all necessary substantiating data used to establish the proposed mix designs if ACI 301-99 Section 4.2.3.1 is followed.

C. Mix designs shall be submitted for all mixes proposed or required to be used, including all mixes containing admixtures.

D. A certified copy of the control records of the proposed production facility establishing the standard deviation as defined in Paragraph 4.2.3.2. of ACI 301.

E. Submit shop drawings as specified in ACI 301. Submit shop drawing showing the location of proposed connection and control joints separate from the steel reinforcement shop drawings.

1. Construction Joints

2. Contract Joints

3. Steel Reinforcement

1.04 QUALITY ASSURANCE

The Contractor shall obtain and have available in the field office at all times, the following references:

A. Specifications for Structural Concrete for Buildings ACI 301 (latest Revision).

B. Field Reference Manual: Specifications for Structural Concrete for Buildings SP-15 (89).

Available from:

The American Concrete Institute
Publications Department
P.O. Box 19150
Detroit, Michigan 48219-0150

C. Manual of Standard Practice - CRSI. (Latest Edition).

D. Placing Reinforcing Bars - CRSI (Latest Edition).

Available from:

Concrete Reinforcing Steel Institute
933 North Plum Grove Road
Schaumburg, Illinois 60173-4758

PART 2 - PRODUCTS

2.01 CLASSES OF CONCRETE AND USAGE

A. Structural concrete of the various classes required shall be proportioned by either Method 1 or Method 2 of ACI 301 to produce the following 28-day compressive strengths:

1. Selection of Proportions for Class A Concrete:

   a. 4,000 psi compressive for strength at 28 days.

   b. Type II cement plus dispersing agent and air.

   c. Max. (water)/(cement and dispersing agent) ratio = 0.45.

   d. Min. cement content = 564 lbs. (6.0 bags)/cu. yd. concrete.

   e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max.). Walls with architectural treatment shall use No. 67 (3/4" max.).

   f. Air content = 6% plus or minus 1% by volume.

   g. Slump = 3" - 4" in accordance with ASTM C 143.

2. Selection of Proportions for Class B Concrete:

   a. 3,000 psi compressive strength at 28 days.

   b. Type I cement plus dispersing agent and air.

   c. Max. (water)/(cement and dispersing agent) ratio = 0.56.

   d. Min. cement content = 470 lbs. (5.0 bags)/cu. yd. concrete.

e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max). Walls with architectural treatment shall use No. 67 (3/4" max.).

f. Air content = 6% plus or minus 1% by volume.

g. Slump - 3" - 4" in accordance with ASTM C 143.

B. Concrete shall be used as follows:

1. Class A concrete for all concrete work except as noted below.

2. Class B concrete for fill concrete, thrust blocks and topping over hollow-core slabs, and where indicated on the Drawings.

C. Type II cement conforming to ASTM C 150 shall be used in all structural concrete. The alkali content shall not exceed 0.6% calculated as sodium oxide. Cement for exposed to view concrete shall have a uniform color classification.

D. Coarse aggregate for concrete shall be size No. 57, as specified in ASTM C33 unless a smaller size aggregate is required to conform to provisions of Section 4.2.2.3 of ACI 301. Coarse aggregate shall conform to all requirements of ASTM C33.

E. Manufactured sand shall not be used as fine aggregate in concrete.

F. Fly ash: Fly ash shall not be used.

G. Silica Fume: Silica fume shall conform to ASTM D 1240. Use Force 10,000S Silica Fume by W.R. Grace; Sikacrete 950 by Sika Corporation; Rheomac SF 110 by Master Builders; or equal. Blended cements with interground silica fume will not be allowed.

1. Water content of liquid slurry silica fume admixtures shall be considered as part of the mixing water when calculating the water/cement ratio.

2. Silica fume shall be added at the batch plant as recommended by the manufacturer. For all types of mixing equipment, mix times shall be increased by 40 percent over the minimum mix time required to achieve mix uniformity as defined by ASTM C 94. For truck-mixed and central mixed concrete, maximum allowable batch size shall be 80 percent of the maximum as called out by ASTM 94.

2.02 ADMIXTURES

A. An air entraining admixture shall be used on all concrete and shall be synthetic air entrainment such as that manufactured by Master Builders or approved equal. Certification attesting to the percent of effective solids and compliance of the material with ASTM C 260 shall be furnished, if requested.

B. A water-reducing, set controlling admixture (nonlignin type) shall be used in all concrete. The admixture shall be a combination of polyhydroxylated polymers including catalysts and components to produce the required setting time based on job site conditions, specified early strength development, finishing characteristics required, and surface texture, as determined by the Engineer.

C. Certification shall be furnished attesting that the admixture exceeds the physical requirements of ASTM C 494, Type A, water-reducing and normal setting admixture, and when required, for ASTM C 494, Type D, water-reducing and retarding admixture when used with local materials with which the subject concrete is composed.

D. The admixture manufacturer, when requested, shall provide a qualified concrete technician employed by the manufacturer to assist in proportioning concrete for optimum use. He shall also be available when requested to advise on proper addition of the admixture to the concrete and on adjustment of the concrete mix proportions to meet changing job conditions.

E. The use of admixtures to retard setting of the concrete during hot weather, to accelerate setting during cold weather, and to reduce water content without impairing workability will be permitted if the following conditions are met:

The admixture shall conform to ASTM C494, except that the durability factor for concrete containing the admixture shall be at least 100 percent of control, the water content a maximum of 90 percent of control and length change shall not be greater than control, as defined in ASTM C 494.

F. Where the Contractor finds it impractical to employ fully the recommended procedures for hot weather concreting, the Engineer may at his discretion, require the use of a set retardant admixture for mass concrete 2.5 feet or more thick for all concrete whenever the temperature at the time concrete is cast exceeds 80^{o}F. The admixture shall be selected by the Contractor subject to the review of the Engineer. The admixture and concrete containing the admixture shall meet all the requirements of these Specifications. Preliminary tests of this concrete shall be required at the Contractor's expense.

G. Corrosion inhibiting admixture “Sika Ferrogard 901” or approved equal shall be used in all liquid containing structures.

H. When more than one (1) admixture is used, all admixtures shall be compatible. They should preferably be by the same manufacturer.

I. Calcium chloride will not be permitted as an admixture in any concrete.

2.03 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. Wire-mesh reinforcement shall be continuous between expansion joints. Laps shall be at least one full mesh plus 2 inches, staggered to avoid continuous lap in either direction, and securely wired or clipped with standard clips.

C. Smooth dowels shall be plain steel bars conforming to ASTM A 615, Grade 60, or steel pipe conforming to ASTM A 120, Schedule 80. Pipe, if used, shall be closed flush at

each end with mortar or metal or plastic cap. Dowels shall be installed at right angles to construction joints and expansion joints. Dowels shall be accurately aligned parallel to the finished surface, and shall be rigidly held in place and supported during placing of the concrete. One end of dowels shall be oiled or greased or dowels shall be coated with high density polyethylene with a minimum thickness of 14 mils.

D. 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. Particular attention is directed to the requirement of Paragraph 3.3.2.4 of ACI Standard 301. These requirements apply to all reinforcement, whether in walls or other vertical elements, inclined elements or flatwork.

E. Particular care shall be taken to bend tie wire ends away from exposed faces of beams, slabs and columns. In no case shall ends of tie wires project toward or touch formwork.

2.04 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.

1. Slots shall be galvanized dovetail-type as specified in Section "Masonry Work".

2. Inserts shall be malleable iron or steel, and of sturdy design adequate strength for the load to be carried. All inserts shall be galvanized. Adjustable wedge inserts shall have an integral loop or strap at the back, or shall be slotted to receive a special-headed bolt not smaller than 5/8-inch in diameter and of the required length and fitted with hexagonal nut. Other inserts shall be either threaded or slotted as required by their usage. Threaded inserts shall have integral lugs to prevent running.

3. Concrete anchors shall be an approved expansion type conforming to Federal Specification FF-S-325, Groups I, II, III, or VIII and shall be installed in strict accordance with the manufacturer's recommendations. Material for anchors shall be as specified in Section 05500 "Miscellaneous Metals". Anchors shall develop ultimate shear and pull out loads of not less than the following values in Class A concrete:

Bolt Diameter (Inches)	Min. Shear (Pounds)	Min. Pull-Out Load (Pounds)
1/2	4,500	4,600
5/8	6,900	7,700
3/4	10,500	9,900

B. Epoxy bonding adhesive used to bond fresh plastic concrete to sound, hardened concrete shall meet the following Specification. Contractor shall furnish a notarized certification by the manufacturer that the proposed material meets the Specification.

1. Material:

The epoxy material shall consist of a 2-component system whose components conform to the following requirements:

a. Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A condensation type, containing suitable viscosity control agents and having an epoxide equivalent of 180-200.

b. Component B - The B component shall be primarily a reaction product of one mole of an aliphatic polyamine and two moles of mono-functional epoxide containing compounds modified with 2, 4, 6 tri (dimethylaminomethyl) phenol.

c. The component ratio of B to A by volume shall be as specified by the manufacturer.

2. Properties of Mixed Components:

a.	Solids Content	100% by weight
b.	Pot Life	25-35 min. @ 73°F.
c.	Tack-Free Time (Thin Film)	4-5-1/2 hrs @ 73°F.
d.	Final Cure ASTM D 695 (75% ultimate strength)	3 days at 73°F.
e.	Initial Viscosity (A+B)	2,000 cps. min at 73°F.
f.	Color Mixed	Straw

3. Properties of Cured Material (Neat Material):

a.	Tensile Strength ASTM D 638	3,000 psi min. @ 14 days 73°F. cure
b.	Tensile Elongation ASTM D 638, modified	½ - 2% at 14 days 73°F. cure
c.	Compressive Strength ASTM D 695	12,500 psi min. at 73° F. cure
d.	Compressive Modules ASTM D 695	470,000 psi min. @ 28 days, 73°F cure
e.	Compressive Strength ASTM D 695	5,500 psi min. @ 24 days 73°F cure
f.	Water Pick-up ASTM D 570	1.5 max.

C. Flashing reglets shall be as specified in Section 07530. Reglets shall be correctly placed into forms prior to placing concrete in formwork.

D. Premolded expansion-joint filler strips shall conform to ASTM D 1752 and shall be 3/8-inch thick unless otherwise shown.

E. Joint sealants shall conform to ANSI A 116.1. The following joint sealants are acceptable:

1. Colma by Sika Chemical Corporation

2. Hornflex by A.C. Horn, Inc.

3. Sonolastic by Sonneborn Division of Contech, Inc.

F. Nonshrink grout shall be Embeco 636 grout by Master Builders Company, Euco Firmix grout by the Euclid Chemical Company, or equal. The approved product shall be delivered to the site of the Work in the original sealed containers, each bearing the trade name of the material and the name of the manufacturer.

G. Hardeners and dustproofers shall be colorless, aqueous solution of zinc or magnesium fluosilicate. Each gallon of solution used for the first application shall contain not less than one pound of crystals. Each gallon of solution used for subsequent application shall contain not less than two pounds of crystals. Materials shall be reviewed by the Engineer.

H. Porous fill shall be crushed rock or gravel of such size that all will pass a 1-1/2 inch screen and not more than 5 percent will pass a No. 4 screen, free from earth clay or other foreign substances.

I. Waterstops: Waterstops shall be styrene-butadiene rubber, standard (non-split) type, flat dumbbell shape (no center bulb), of size shown on Drawings, complete with fittings as required such as unions, vertical tees, vertical ells, flat crosses, flat ells, flat tees, etc. Waterstops shall be securely wired into place to maintain proper position during placement of fresh concrete, as shown on the Drawings. Care shall be taken in the installation of the waterstop and the placing of the concrete to avoid "folding" while concrete is being placed, and to prevent voids in the concrete surrounding the waterstop.

All materials, including adhesive, shall be W.R. Grave SERVICISED Construction Products; Williams Products, Inc.; Construction Gaskets, Inc.; or equal, and shall be installed in accordance with the manufacturer's recommendations.

J. Form Liners: Form liners for construction of fluted wall treatment shall be prefabricated plastic liners as manufactured by Greenstreak Plastic Products, Interform Company, or Symons Corporation.

Liners shall be fiberglass or ABS (acrylonitrile - butadiene - styrene) of such configuration as to obtain the fluted pattern shown or indicated on the Drawings.

For purposes of designating type and quality of material required, form liners shall be pattern 361 trapezoidal liners as manufactured by Greenstreak Plastic Products.

Preparation of forming materials, sealing of joints to prevent grout leakage and form release treatment (if required) shall be in strict compliance with the manufacturer's printed instructions and recommendations.

PART 3 - EXECUTION

3.01 FINISHES

A. Exposed to Public View Concrete Surfaces:

1. All concrete exposed to view in the completed structure shall be produced using materials and workmanship to such quality that only nominal finishing will be required. The provisions of paragraphs 6.2.2.1 and 6.3.6 of ACI 301 shall apply to all exterior exposed to public view concrete surfaces, including the outside surfaces of tanks.

2. Forms for exposed concrete surfaces shall be exterior grade, high-density overlay plywood, steel, or wood forms with smooth tempered hard-board form-liners.

3. Forms shall be coated with an approved release agent before initial pour and between subsequent pours, in accordance with the manufacturer's printed instructions. Form boards shall not be wet water prior to placing concrete.

4. Recessed joints in concrete shall be formed using lacquer-coated wood battens or forms, milled to indicated profiles. Battens and corner strips shall be carefully inspected before concrete is placed and damaged pieces replaced.

5. Chamfer strips shall be 1 inch radius with leg, polyvinyl chloride strips by Gateway Building Products, Saf-T-Grip Specialties Corp., Vinylex Corp., or equal.

6. Particular attention is directed to the requirements of paragraphs 5.3.3.3G and 6.3.3 of ACI 301. Form panels shall be provided in the maximum sized practicable in order to minimize form joints. Wherever practicable, form joints shall occur at recessed joints. All form joints in exterior exposed to view surfaces shall be carefully caulked with an approved nonstaining caulking compound. Joints shall not be taped. Form oil or other material which will impart a stain to the concrete shall not be allowed to contact concrete surfaces.

7. Care shall be taken to prevent chipping of corners or other damage to concrete when forms are removed. Exposed corners and other surfaces which may be damaged by ensuing operations shall be protected from damage by boxing, corner boards or other approved means until construction is completed.

8. Form ties shall remain in the walls and shall be equipped with a waterseal to prevent passage of water through the walls. Minimum set back of form ties shall be 1-1/2 inches from faces of wall. The hole left by removal of tie ends shall be sealed and grouted in accordance with the procedure described hereinafter in Par. 3.01.F. Form ties will be permitted to fall within as-cast areas of architecturally treated wall surfaces (ACI Chapter 13); this does not apply to walls receiving decorative waterproof masonry coating.

9. All formed exposed to view concrete surfaces shall have a "smooth rubbed finish". Exterior vertical surfaces shall be rubbed to one foot below grade. Interior exposed to public view vertical surfaces of liquid containers shall be rubbed to one (1) foot below the minimum liquid level that will occur during normal operations.

B. All vertical surfaces in liquid containing structures shall have a "smooth form" finish.

All "smooth form" concrete vertical surfaces shall be a true plane within 1/4 inch in 10 feet as determined by a 10 foot straightedge place anywhere on the surface in any direction. Abrupt irregularities shall not exceed 1/8 inch.

C. Basin, flume, conduit and tank floors shall have a "troweled" finish unless shown otherwise on Drawings.

D. Weirs and overflow surfaces shall be given a "troweled" finish.

E. Exterior platforms, steps and landings, shall be given a "broom" finish. "Broom" finish shall be applied to surfaces which have been steel-troweled to an even, smooth finish. The troweled surface shall then be broomed with a fiber-bristle brush in the direction transverse to that of the main traffic.

F. Patching of holes due to removal of tie ends and other repairable defective areas, shall be as follows: Entire contact area of hole shall be coated with two-part moisture insensitive epoxy bonding compound as specified in Par. 2.04.B. in accordance with manufacturer's specifications, and prior to placing of freshly mixed patching mortar. Parching mortar shall be mixed and placed in general accordance with ACI Par. 5.3.7.5.

G. For floors and slabs in which drains occur, special care shall be exercised to slope the floors uniformly to the drains. All floors with drains shall be sloped not less than 1/8 inch per foot unless otherwise shown. In all areas where quarry tile or other materials requiring more than 1/4 inch drop are to be overlaid, the concrete base slab shall be depressed as shown to provide a finished floor at the same elevation as surrounding areas.

3.02 TESTING

A. All testing shall be in accordance with provisions of ACI 301. Testing services listed in ACI Sections 1.6.4 shall be performed by a testing agency acceptable to the Engineer and Owner.

B. The testing services of ACI sections 1.6.4.2 and 1.6.4.3 shall be performed at the Contractor’s expense. The Contractor shall be responsible for making concrete test cylinders, storing and protecting concrete cylinders and delivering cylinders to the Owner-approved testing laboratory.

3.03 ADDITIONAL REQUIREMENTS

A. Unless otherwise directed by the Engineer, the vertical surfaces of footings shall be formed. Excavations and reinforcement for all footings shall have been inspected by the Engineer before any concrete is placed.

B. The installation of underground and embedded items shall be inspected before slabs are placed. Pipes and conduits shall be installed below the concrete unless otherwise

indicated. Fill required to raise the subgrade shall be placed as specified in Section 02300 "Earthwork". Porous fill not less than 6 inches in compacted thickness shall be installed under all slabs, tank bottoms, and foundations. The fill shall be leveled and uniformly compacted to a reasonably true and even surface. The surfaces shall be clean, free from frost, ice, mud and water. Waterproof paper, polyethylene sheeting of nominal 4-mil minimum thickness, or polyethylene-coated burlap shall be laid over all surfaces receiving concrete.

C. Concrete shall be placed in layers not over 18 inches deep and each layer shall be compacted by mechanical internal-vibrating equipment supplemented by hand spading, rodding and tamping as directed. Vibrators shall not be inserted into lower courses that have begun to set.

D. Concrete that is truck mixed or transported in truck mixers or truck agitators shall be delivered to the site of the work and discharge completed in the forms within the time specified in Paragraph 10.7 of ASTM C 94 except that when the concrete temperature exceeds 85^{o}F., the time shall be reduced to 45 minutes. Transit-mixed concrete that is completely mixed at the site of concrete placement or batched cement and aggregates transported to mixers shall be placed in the forms within 1-1/2 hours after cement has been added. Concrete shall be placed in the forms within 15 minutes after discharge from the mixer at the job site.

E. If concrete is placed by pumping, no aluminum shall be used in any parts of the pumping system which contact or might contaminate the concrete. Aluminum chutes and conveyors shall not be used.

F. All concrete surfaces not in contact with forms shall be moist cured by the application of absorptive mats or double thicknesses of fabric kept continuously wet. Forms shall be kept continuously wet. Use of other curing methods will not be permitted unless written authorization is received from the Engineer.

G. The unit of operation shall not exceed 30 feet for tank walls and walls exposed to weather, and 45 feet for other work in any horizontal direction and not less than 48 hours shall elapse between casting of adjoining units unless these requirements are waived by the Engineer. Provision shall be made for jointing successive units as indicated or required to be made at spacing of approximately 25 feet. Additional construction joints required to satisfy the 25 foot spacing shall be located by the Contractor subject to the review of the Engineer. The Contractor shall submit for review drawings separate from the steel reinforcing drawings, showing the location of all proposed construction joints. All construction joints shall be prepared for bonding by roughening the surface of the concrete in an acceptable manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface. Joints in walls and columns shall be maintained level. Concrete shall be placed in layers not over 18 inches deep and each layer shall be compacted by mechanical internal-vibrating equipment supplemented by hand spading, rodding and tamping as directed. Vibrators shall not be inserted into lower courses that have begun to set.

H. Formwork for beam soffits and slabs and other parts that support the weight of concrete, shall remain in place until the concrete has reached its specified 28-day strength, unless otherwise specified or permitted.

I. Concrete Walks and Curbs:

1. Subgrade shall be true and well compacted at the required grades. Spongy and otherwise unsuitable material shall have been removed and replaced with

approved material. Concrete walks shall be placed upon porous fill covered with waterproof paper, polyethylene sheeting of nominal 4-mil minimum thickness or polyethylene-coated burlap.

2. Concrete walks shall be not less than 4 inches in thickness. Walks shall have contraction joints every 5 linear feet in each groove in the top surface of the slab to a depth of at least one-fourth the slab thickness with a jointing tool. Transverse expansion joints shall be installed at all returns, driveways, and opposite expansion joints in adjacent curbs. Where curbs are not adjacent, transverse expansion joints shall be installed at intervals of approximately forty (40) feet. Sidewalks shall receive a "broomed" finish. Scoring shall be in a transverse direction. Edges of the sidewalks and joints shall be edged with a tool having a radius not greater than 1/6 inch. Sidewalks adjacent to curbs shall have a slope of 1/4 inch per foot toward the curb. Sidewalks not adjacent to curbs shall have a slope of 1/4 inch per foot. The surface of the concrete shall show no variation in cross section in excess of 1/4 inch in 5 feet. Concrete walks shall be reinforced with 66-1010 welded wire fabric.

3. Concrete curbs shall be constructed to the section indicated on the Standard Detail, and all horizontal and vertical curves shall be incorporated as indicated or required. Forms shall be steel as approved by the Engineer. At the option of the Contractor, the curbs may be precast or cast-in-place. Cast-in-place curbs shall be divided into sections 8 to 10 feet in length using steel divider plates. The divider plates shall extend completely through the concrete and shall be removed. Precast curbs shall be cast in lengths of 4 to 5 feet. All exposed surfaces of concrete shall be finished smooth. All sharp edges and the edges of joints and divisions shall be tooled to 1/4 inch radius. Steel reinforcement shall be installed where the curb crosses pipe trenches or other insecure foundations. Such reinforcement shall consist of two (2) No. 4 deformed bars near the bottom of the curb and shall extend at least 24 inches beyond the insecure area. Transverse expansion joints shall be installed at all curb returns and at intervals of approximately 40 feet.

J. Column base plates, bearing plates for beams and similar structural members, machinery and equipment bases shall, after being plumbed and properly positioned, be provided with full bearing with nonshrink grout. Concrete surfaces shall be rough, clean, free of oil, grease, and laitance and shall be moistened thoroughly immediately before grout is placed. Metal surfaces shall be clean and free of oil, grease and rust. Mixing and placing shall be in conformance with the material manufacturer's printed instructions. After the grout has set, exposed surfaces shall be cut back 1 inch and covered with a parge coat of mortar consisting of 1 part Portland cement, 2 parts sand and sufficient water to make the mixture placeable. Parge coat shall have a smooth dense finish. Exposed surfaces of grout and parge coat shall be water cured with wet burlap for 7 days.

K. Grout fill which is formed in place by using rotating equipment as a screen, such as clarifiers and similar types of equipment, shall be mixed in proportions and consistencies as required by the manufacturer or supplier of the equipment.

L. Watertightness:

1. The structures which are intended to contain liquids and/or will be subjected to exterior hydrostatic pressures shall be so constructed that, when completed and tested, there shall be no loss of water and no wet spots shall show.

2. As soon as practicable, after the completion of the structures, the Contractor shall fill them with water and if leakages develop or wet spots show, the Contractor shall empty such structures and correct the leakage in an approved manner. Any cracks which appear in the concrete shall be dug out and suitably repaired. Temporary bulkheads over pipe openings in walls shall be provided as required for the testing.

3. After repairs, if any are required, the structures shall be tested again and further repaired if necessary until satisfactory results are obtained. All work in connection with these tests and repairs shall be at the expense of the Contractor.

4. Waterstops shall be placed in other locations as indicated on the Drawings and as may be required to assure the watertightness of all containers of liquids. Special shop fabricated ells, tees and crosses shall be provided at junctions. Waterstops shall be extended at least 6 inches beyond end of placement in order to provide splice length for subsequent placement. In slabs and tank bottoms, water stops shall be turned up to be made continuous with waterstops at bottom of walls or in walls.

5. Joints between pipe (except cast iron wall pipe) and cast-in-place concrete walls shall be sealed by means of a groove cast completely around the pipe; the groove shall be filled with a quick setting hydraulic compound similar and equal to Waterplug as made by Standard Dry Wall Products, Inc., mixed and applied in accordance with the manufacturer's instructions.

M. Unless otherwise shown or directed, all pumps, other equipment, and items such as lockers, motor control centers and the like, shall be installed on concrete bases. The bases shall be constructed to the dimensions shown on the plans or as required to meet plan elevations. Where no specific plan elevations are required, the bases shall be 6 inches thick and shall extend 3 inches outside the metal equipment base. In general, the concrete bases shall be placed up to 1-inch below the metal base. The equipment shall then be properly shimmied to grade and the 1-inch void filled with nonshrink grout. Prior to the final set of the grout it shall be cut back and the edge plastered with 1:2 cement mortar.

N. Concrete which, in the opinion of the Architect-Engineer, has excessive honeycomb, aggregate pockets or depressions will be rejected and the Contractor shall, at his own expense, remove the entire section containing such defects and replace it with acceptable concrete.

O. Manhole or access steps shall be plastic, constructed of copolymer polypropylene meeting the requirements of ASTM D 2146 for Type II, Grade 16906 material. Step shall be reinforced with ASTM A 615, Grade 60, #4 deformed steel reinforcing bar, be 9" deep, 14" wide, provided with notched tread ridge, foot retainer lugs on each side of tread and penetration stops for press fit installation. Plastic steps shall be PS2-PF as manufactured by M.A. industries, Inc., Peachtree City, Georgia. Steps shall be installed by drilling 1" diameter holes, minimum 3-3/4 inches deep into the wall, and then driving steps into hole to the penetration stop, resulting in a press fit condition.

P. Tank pressure relief valves shall be 6" diameter Neenah Foundry Company R-5001-1, American Valve & Hydrant B315.1, or equal, floor type, with outside hooks or inside self-contained lock; quantity and spacing as shown on structural drawings. No part of pressure relief valves shall project above the neat line of the tank floor to prevent fouling of scraper mechanisms where used.

Q. All existing contact surfaces with new patch shall be coated with moisture insensitive epoxy bonding adhesive, Sikadur Hi-Mod, Sonobond, or equal. Patch shall consist of base pour of 4,000 psi structural concrete, then a topping of non-shrink natural aggregate grout, Master Builders Masterflow 713, Sonogrout, or equal, mixed and placed in accordance with manufacturer's instructions, to the thicknesses shown on Drawings. Coat base pour with epoxy bonding adhesive prior to placing grout course.

END OF SECTION

SECTION 03600-PRECISION GROUTING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, material, equipment and services required for grouting of equipment, machinery, structural steel, handrails, anchor bolts and other items or work for which grouting is specified or required.

B. The object of these Specifications is to obtain grout which can be mixed to a flowable consistency (i.e., thinner than plastic consistency), placed in leakproof forms, with a minimum of strapping, without bleed water exceeding Specification requirements. The requirement of 24 hour presoak of existing concrete is of prime importance and must be adhered to. Trade name of grout shall be submitted to Engineer for review well in advance of preparation for grouting.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-in-place Concrete is included in Section 03300.

B. Review all divisions and sections for equipment, machinery, and other items to be grouted.

1.03 DESCRIPTION OF WORK

A. High strength, precision support of machine bases and soleplates, setting anchor bolts, including equipment subject to thermal movement and repetitive dynamic loading.

B. Work includes providing a non-shrink, ready-to-use, fluid 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 specified in this section.

1.04 QUALITY ASSURANCE

Comply with the following codes, standards, tests and recommended practices for foundation concrete as applies to precision grouting.

A. ACI 304R-85 " Guide for Measuring, Mixing, Transporting and Placing Concrete."

B. ACI 305R-77 (Revised 1982) "Recommended Practice for Hot Weather Concreting."

C. ACI 306R-78 (Revised 1983) "Recommended Practice for Cold Weather Concreting."

D. ACI 347-78 "Recommended Practice for Concrete Formwork."

E. ASTM C 309-74 "Standard Specifications for Liquid Membrance Forming Compounds for Curing Concrete."

F. Manufacturer's Information Use of Grout: Attached to each bag of grout.

G. Corps of Engineers CRD C-79 Method of Test for Flow of Grout Mixtures (Flow-Cone method).

H. ASTM C 109-73 "Tentative Method of Test for Compressive Strength of Hydraulic Cement Mortars."

1.05 SUBMITTALS

A. Purchase Orders: Furnish copies of purchase orders relating to materials in this Section to the Engineer prior to delivery.

PART 2 - PRODUCTS

2.01 GROUT

A. Precision-support grout shall consist of a cementitious system, special graded and processed ferrous metallic internal reinforcing aggregate, carefully graded natural fine aggregate and additional technical components.

B. Grouts which depend upon aluminum powders, chemicals or other agents which produce gas for expansion are not acceptable.

1. Free of gas producing agents.

2. Free of oxidizing catalysts.

3. Free of inorganic accelerators, including chlorides.

C. Provide Performance Characteristics when mixed to fluid consistency, 25 to 30 seconds (Flow Cone Method CRD C-79), as follows:

1. No visible bleeding and/or settlement up to 2 hours on 1/4 to ½ gal. grout poured into gallon can, covered with glass plate to prevent evaporation. Grout shall meet the requirements of Paragraph 4.1 of Corps of Engineers CRD C 588-76.

2. Maintain firm, full contact with underside of 4'x 4' x ½" steel plate firmly bolted to supports at quarter points at 1, 7 and 14 days, evidenced by tapping of plate and visual observation after stripping. Grout shall be cured in accordance with manufacturer's printed instructions.

3. Provide strengths as specified in Paragraph 3.05 (2" x 2" cubes). Prepare specimens and test in accordance with ASTM C 109-73.

2.02 MEMBRANE CURING COMPOUND

A. Membrane forming curing compound shall be in accordance with ASTM C 309-74.

2.03 WATER

A. Water shall be suitable for drinking.

PART 3 - EXECUTION

3.01 PREPARATION FOR GROUTING

A. Remove laitance down to sound concrete.

B. Surface to receive grout shall be rough and reasonably level.

C. Surface shall be properly wet cured. DO NOT USE CURING COMPOUNDS. (See Section 03300).

D. Clean surface of oil, grease, dirt, and loose particles.

E. Clean bolt holes, bolts and underside of bed plate.

F. Saturate concrete including bolt holes for 24 hours prior to grouting. Blow out excess water with oil free compressed air, or siphon prior to grouting.

3.02 FORMWORK

Formwork shall be compatible with proposed method of placing grout. Design for rapid, continuous and complete filling of space to be grouted.

A. Build strong, tight forms braced so they will not leak or buckle under weight of fluid grout. On placing side, slant form at 45^{o} angle and pour grout directly on slanted face. On other sides, place form ½" or more from base of bed plate and 1" or more higher than underside of the plate.

B. Caulk forms with grouting material being used on inside or a sand-cement mortar outside to prevent leakage and loss of "head." Use expanded polystyrene or other means to caulk between foundation and portions of the bed plate and equipment to seal off areas where grout is not desired.

3.03 PREPARATION OF GROUT

Preparation of grout shall be in paddle-type mortar mixer suitable mechanical mixer. DO NOT MIX BY HAND.

A. Mix grout adjacent to area being grouted, have sufficient manpower and equipment available for rapid and continuous mixing and placing. DO NOT ADD CEMENT, SAND OR PEA GRAVEL ADDITIVES.

B. Avoid a consistency that produces bleeding. Mix materials for a minimum of 3 minutes and place immediately. DO NOT RETEMPER. DO NOT USE MIXING WATER ABOVE 80^{o}F. (27°C.).

3.04 PLACING

Placing of grout shall be at a temperature of 65-75 degrees F. (18-24 degrees C.) for foundation, bed plate and grout material. Maintain for 24 hours following installation, hereafter above 40

degrees F. (4 degrees C.) until strength exceed 4,000 psi (280 kg/cm^2.) DO NOT USE COKE-FIRED SALAMANDERS.

A. Place grout quickly and continuously; avoid surface of overworking material and segregation. DO NOT VIBRATE GROUT. DO NOT OVERWORK GROUT.

B. Field service representative of the manufacturer shall be available during initial planning for installation to suggest recommended procedures and at start of placement for further suggestions.

1. A minimum of three (3) days notice shall be given by the Contractor to the manufacturer prior to use of the product.

3.05 FINISHING AND CURING

Follow manufacturer's printed instructions for the brand and type of grout being used.

A. The grout shall meet the following strengths:

	Plastic Mix	Flowable Mix
1-day	4,000 psi	2,000 psi
3-days	6,000 psi	3,000 psi
7-days	8,000 psi	5,000 psi
28-days	10,000 psi	7,000 psi

END OF SECTION

DIVISION 15

MECHANICAL

SECTION 15010 - GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

The General Requirements of this specification, and the Special Conditions, Division 1, in its entirety, shall be considered part of this section and incorporated hereby, as if fully set forth herein. Requirements of Division 1 supersede and replace any statements in Division 15 with which they are in direct conflict. Sections 15010 through 15199 (as included) contain basic mechanical materials and methods of a general nature and apply to all work specified in Division 15, except as modified in individual sections.

1.01 WORK INCLUDED

A. Refer to Section 15011, Scope of Work, for definition of Project scope and systems to be provided.

1.02 SYSTEM DESCRIPTION

A. Consult Plans and Specifications Sections 15200-15999

B. Drawings:

1. Drawings are schematic and show approximate locations of ducts, piping and equipment. Coordinate and field verify exact locations with other trades.

2. Obtain Engineer's approval for significant deviations from drawing locations and layout.

3. The Engineer reserves the right to make minor changes in the location of mechanical work or equipment prior to roughing-in without additional cost.

4. Examine the Contract Documents and immediately report any error, discrepancy or omission. The Engineer will determine which interpretation shall take precedence where two or more conflicting statements occur. Otherwise, the Contractor is responsible for the more stringent (or expensive) interpretation. In general, schedules, wherever they appear, supersede specifications, and specifications supersede plans.

5. Contractor shall make use of all data in all Contract Documents and shall verify this information at the building site. All Drawings of the Contract set are hereby made a part of these Specifications and shall be consulted by Contractor and his work adjusted to meet the conditions shown thereon.

1.03 QUALITY ASSURANCE

A. Materials, equipment and installation shall meet the requirements of the following as applicable:

1. American National Standards Institute (ANSI).

2. American Society for Testing and Materials (ASTM).

3. American Society of Mechanical Engineers (ASME).

4. National Fire Protection Association (NFPA).

B. All equipment shall bear the label of an approved independent testing laboratory (e.g. UL), where such standards exist.

C. All equipment shall be supplied with integral fusing as required for compliance with its listing.

D. Performance of work shall be in strict accordance with the best common practices of the trades involved, in a thorough, substantial, neat, and workman-like manner by competent, qualified workmen. No trainees or apprentice workmen shall be allowed at the job site unless under the direct, continuous supervision of a qualified journeyman. All work on fire protection or electrical systems shall be supervised and performed by individuals properly licensed, where required by state law, or as otherwise indicated in these Documents.

1.04 REGULATORY REQUIREMENTS

A. The work in this Division shall meet the requirements, as applicable, of the following Codes and regulatory bodies:

1. Kentucky Building Code (KBC).

2. Kentucky Department for Natural Resources and Environmental Protection.

3. Kentucky Department of Public Protection and Regulation, Department of Housing, Buildings, and Construction (State Fire Marshal, Plumbing Div., Building Code Enforcement).

4. Life Safety Code - NFPA 101.

5. Local Building Codes and Health Department.

6. Local Utility Regulations.

B. Conformity with code requirements shall be maintained whether or not official inspections, fees or certificates are required due to project not falling under scope or jurisdiction of regulatory agencies.

1.05 REFERENCES

A. With regard to this Project and these Contract Documents, the following specific definitions shall apply:

1. "Furnish": To purchase and deliver products to the project site and prepare for installation.

2. "Install": To take furnished products, assemble, erect, secure, connect and place into operation.

3. "Provide": To furnish and install.

4. "Products": Includes materials, systems, equipment and accessories, as specified.

5. "Work": The providing of products for any or all of the entire Contract.

6. "Project": The sum total of all work by all parties, to be accomplished as directed in the Contract Documents.

7. "Documents", "Contract Documents": All Plans, Specifications, addenda, bid packages and any other enclosures, agreements or instruments specifically included in the Contract.

8. "Division(s)": Means the generally accepted subdivisions of the Specifications, usually according to the CSI scheme of organizing construction documents, such as Division 15 - Mechanical, Division 16 - Electrical, etc. Also refers to all work covered within the referenced Division(s) of the Specifications.

9. "Section(s)": Means the subdivisions of the "Division" of construction specifications, such as, under Division 15, Section 15010 - General Mechanical Provisions, Section 15011 - Scope of Work, etc. Also refers to all work covered within the referenced Section(s) of the Specifications.

10. "Engineer", "Architect", "E/A", "A/E": The engineering, architectural or architectural/engineering firm with design authority for the Project.

11. "Contractor": Means the General Contractor and also the Plumbing, Fire Protection, Controls, HVAC or any other Mechanical Contractor, individually or collectively.

12 "Concealed": Embedded in or installed behind walls, within partitions, above ceilings, in trenches, in tunnels and crawl spaces. Areas above lay-in ceilings, in crawl spaces or in service tunnels and trenches, other than stand-up utility tunnels, chases or vaults, may be considered concealed with reference to appearance or finish but not concealed with respect to accessibility. Check for specific exceptions.

13. "Exposed": Not installed underground or "concealed" as defined above. Generally, systems in all mechanical spaces, including mechanical or boiler rooms, stand-up or walk-thru chases and utility tunnels or vaults shall be considered to be exposed with respect to finish or accessibility requirements.

14. "Equivalent" or "Equal": In the opinion of the Engineer, acceptably comparable in concept, form, quality, performance and compatibility with the design.

15. "Mechanical": May refer to all mechanical trades, including HVAC, plumbing, fire protection, or may refer to HVAC work as opposed to say plumbing, the difference being necessarily taken from context.

16. “Plans”, “Drawings”: Mean all information presented in a drawing or graphical format, which have been included in the Contract, including but not limited to plans, sections, elevations, details, diagrams, schedules, notes, legends and addenda thereto.

17. "Specifications": Means all information pertaining to performing the Work, presented in text format and in the accepted organization of Divisions and Sections and in the addenda thereto.

18. "Addendum", "Addenda": Means information published after the original distribution of Documents (but before the Bid Opening), which may contain changes to Drawings, Specifications or the bidding process. Such information carries the same weight as if originally included in the Documents.

B. Abbreviations and Symbology:

1. Refer to the following references for any abbreviations, acronyms or symbols not defined in the Contract Documents:

   a. ASHRAE Fundamentals Handbook, current edition, chapter on Abbreviations and Symbols.

2. The following abbreviations may be used throughout the mechanical Documents. Refer also to legends or symbol lists on Drawings and to architectural abbreviations. Note that all abbreviations are not necessarily used.

A, AMP	Ampere	AAE	Automatic Air Eliminator
AV	Air Vent		
AAV	Automatic Air Vent	ABV	Above
AC	Alternating Current Air Conditioning	ACCU	Air Cooled Condensing Unit
AD	Access Door	ADDL	Additional
ADJ	Adjustable Adjacent	ARL	Above Roof Level
A/E	Architect/Engineer	AFF	Above Finished Floor
AHU	Air Handling Unit	ALT	Altitude Alternate
AL	Aluminum		
ALTN	Alternate	ANOD	Anodized, Anode
AP	Access Panel	APPROX	Approximate
ARCH	Architect(ural)	ATM	Atmosphere
AUTO	Automatic	AV	Acid Vent
AVG	Average	AW	Acid Waste
AWG	American Wire Gauge	AWT	Average Water Temperature
AFD	Adj. Freq. Drive		
BDD	Backdraft Damper	BD	Board
BEL	Below	BHP	Brake Horsepower
BLDG	Building	BOD	Bottom of Duct (Elevation)
BOP	Bottom of Pipe (Elevation)	BRK	Break, Breaker
BRKT	Bracket	BRZ	Bronze, Braze
BS	Bird Screen	BSMT	Basement
BTU	British Thermal Unit	BTUH	BTU/HR
		BFP	Backflow Preventer
CAP	Capacity	CB	Catch Basin
CC	Center to Center	CD	Ceiling Diffuser
CEIL	Ceiling	CENT	Central
CFH	Cubic Feet/Hour	CFM	Cubic Feet/Minute

CHG	Charge, Change	CG	Ceiling Grille
CI	Cast Iron	CKT	Circuit
CLG	Cooling	CLO	Closet
CLR	Clear	CO	Carbon Monoxide
CO	Cleanout	CO2	Carbon Dioxide
COL	Column	COMP	Compound
CONC	Concrete		Compressor (ed)
COND	Condensate, Condensation	CONFIG	Configuration
	Condenser	CONN	Connection
		CONST	Construction
CONT	Control(s), Continuous	CONTR	Contractor
		COP	Coefficient of Performance,
CPLG	Coupling		Copper
CT	Cooling Tower	CU	Copper, Condensing Unit, Cubic
CTR	Center		
CUH	Cabinet Unit Heater	CIRC	Circular
		CWR	Chilled Water Return
CW	Cold Water		
CWS	Chilled Water Supply	CR	Ceiling Register
D	Depth, Diameter Differential	dB	Decibels
		DOUB	Double
DB	Dry Bulb	DC	Direct Current
DCW	Domestic Cold Water	DD	Direct Drive
		DDC	Direct Digital Control
DET	Detail		
DF	Drinking Fountain	DG	Door Grille
DHW	Domestic Hot Water	DHWR	Domestic Hot Water Return
DI	Double Inlet		
DIA	Diameter	DIFF	Diffuser
DIM	Dimension	DISC	Disconnect
DISCH	Discharge	DL	Door Louver
DN	Down	DP	Double Pole
DS	Downspout	DT	Double Throw
DW	Double Width	DWG	Drawing
DWH	Domestic Water Heater	DWV	Drain, Waste and Vent
DR	Drain	DHBC	See HBC
E	East	EA	Each, Entering Air
EER	Energy Efficiency Ratio		Exhaust Air
		EF	Exhaust Fan
		EGW	Ethylene Glycol/ Water Mixture
EL	Elevation		
ELEC	Electric	EMD	End of Main Drip
EMER	Emergency	ENTR	Entrance
ENT	Entering	EQUIP	Equipment
EQ	Equal, Equivalent	ET	Entering Temperature
EVAP	Evaporative		Expansion Tank
EW	Eye Wash	EWC	Electric Water Cooler
EWH	Electric Wall Heater		
EWT	Entering Water Temperature	EXH	Exhaust
		EXIST	Existing
EXP	Expansion,	EXT	Exterior,

	Exposed, Explosion		External, Extruded
EDB	Entering Dry Bulb	EAT	Entering Air Temperature
EWB	Entering Wet Bulb	ESP	Ext.Static Pres.
F	Fahrenheit Temperature	FCU	Fan/Coil Unit
FDN	Foundation	FD	Floor Drain
FE	Fire Extinguisher		Fire Damper
FF	Fouling Factor	FEC	Fire Extinguisher Cabinet
FHC	Fire Hose Cabinet	FH	Fire Hydrant
FIN	Finish	FIG	Figure
FLA	Full Load Amps	FL, FLR	Floor
FLUOR	Fluorescent	FLEX	Flexible
FOS	Fuel Oil Supply, Suction	FOR	Fuel Oil Return
FPH	Frost-Proof Hydrant	FP	Fire Protection
FPT	Female Pipe Thread	FPF	Fins Per Foot
FTR	Finned Tube Radiation	FPM	Feet Per Minute
FCV	Flow Cont. Valve	FPS	Feet Per Second
		FR	Frame
		FT	Feet
		FVC	Fire Valve Cabinet
		FSD	Fire/Smoke Damper
GA	Gauge	GAL	Gallon
GALV	Galvanized	GI	Grease Interceptor
GL	Glass	GND, GRD	Ground
GPD	Gallons Per Day	GPH	Gallons Per Hour
GPM	Gallons Per Minute	GR	Grade, Grille
H	Height, Horizontal	HB	Hose Bib
HT, HGT	Height	HD	Head
HIGH	Height	HDWE	Hardware
HEX	Hexagonal	HOA	Hand/Off/Automatic
HORIZ	Horizontal	HP	High Pressure
HPR	High Pressure Steam Condensate Return		Horsepower
			Heat Pump
		HPS	High Pressure Steam
HI	High		
HR	Hour	HS	Hair Strainer
HTG	Heating	HTR	Heater
HUH	Horizontal Unit Heater	HVAC	Heating, Ventilating and Air Conditioning
HVY	Heavy		
HW	Hot Water	HWR	Heating Hot Water Return
HWS	Heating Hot Water Supply	HZ	Hertz = CPS = Cycles/Sec.
HBC	Ky. Dept. of Housing, Buildings, Const.	HWH	Hot Water Heater (Domestic)
ID	Inside Diameter, Inside Dimension	ID	Identification
		IDENT	Identification
ICC	International Code	IFB	Integral Face and

	Council		Bypass Damper
IN	Inches, Input	INCAND	Incandescent
IN.Hg	Inches of Mercury	INSUL	Insulation
INJ	Injection, Injector	IN.W.C.,	Inches of Water
IND	Indirect Drain	IN.W.G.	column
IR	Infrared	INV	Invert
IMC	International Mechanical Code		
JT	Joint		
KIT	Kitchen	KV	Kilovolt
KVA	Kilovolt Amps	KW	Kilowatt
KWH	Kilowatthour	KBC	Ky. Bldg. Code
L	Long, Louver, Latent	LB, #	Pound
LFS	Low Fire Start	LG	Length
LAT	Leaving Air Temperature Latent	LAV	Lavatory
		LIQ	Liquid
LP	Low Pressure Liquified Petroleum (Gas)	LPR	Low Pressure Steam Condensate Return
LPS	Low Pressure Steam	LT	Light, Leaving Temperature
LTG	Lighting		
LWT	Leaving Water Temperature	LVG	Leaving
		LDB	Leaving Dry Bulb
LWB	Leaving Wet Bulb	LO	Low
MA	Milliampere	MACH	Machine
MAN	Manual	MATL	Material
MAV	Manual Air Vent	MAX	Maximum
MBH	Thousand BTU Per Hour	MD	Manual Damper
		MECH	Mechanical
MET	Metal	MEZZ	Mezzanine
MFR	Manufacturer	MH	Manhole
MIN	Minimum, Minute	MISC	Miscellaneous
MK	Mark	MO	Motor-Operated
MOD	Motorized Damper Modulating		Month
		MPH	Miles Per Hour
MPR	Medium Pressure Steam Condensate Return	MPS	Medium Pressure Steam
		MPT	Male Pipe Thread
MS	Motor Starter	MT	Mount
MTD	Mounted	MTG	Mounting
MV	Millivolt	MW	Megawatt
MCC	Motor Control Ctr.		
N	North, Neutral	NC	Noise Criteria
NEUT	Neutral		Normally Closed
NIC	Not In Contract	NO	Normally Open
NOM	Nominal		Number
NPSH	Net Positive Suction Head	NTS	Not To Scale
O2	Oxygen	OA	Outside Air

OBD	Opposed Blade Damper	OD	Outside Diameter Outside Dimension
OC	On Center (s)	OPN	Operation
OPP	Opposite	OPNG	Opening
OVHD	Overhead	OZ	Ounces
P	Pressure, Pump	PD	Pressure Drop
PERF	Perforated	PH	Phase
PIV	Post Indicator Valve	PL	Plate, Property Line
PLBG	Plumbing	PNEU	Pneumatic
PNL	Panel	PPM	Parts Per Million
PR	Pair	PRELIM	Preliminary
PRES	Pressure	PRI	Primary
PRV	Pressure Regulating Valve	PSC	Permanent Split Capacitor
PSF	Pounds Per Square Foot	PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch, Gauge	PT	Plaster Trap Point
PVC	Polyvinyl chloride	ø	Phase
PCR	Pumped Condensate Return	POC	Point of Conn.
QT	Quart	QTY	Quantity
QUAL	Quality	QX	Heat Exchanger
R	Thermal or Electrical Resistance, Radius	RA	Return Air
		RAD	Radius
		RCP	Reinforced Concrete Pipe
RD	Roof Drain		
RECIRC	Recirculating	RECOV	Recovery
RED	Reducing	REG	Register Regulator
REINF	Reinforced		
REQD	Required	REV	Revised, Revision
RH	Relative Humidity	RM	Room
RND, ø	Round	RPM	Revolutions Per Minute
RPS	Revolutions Per Second	RWC, RWL	Rainwater Conductor
RG, RAG	Return Air Grille	RPZ	Reduced Pressure Zone (BFP)
RF	Return Fan		
RECT	Rectangular		
S	South, Sensible	SA	Supply Air
SAN	Sanitary	SCH	Schedule
		SCHED	Schedule(d)
SCR	Silicon-Controlled Rectifier	SD	Smoke Detector Storm Drain
SEC	Secondary	SECT	Section, Sector
SENS	Sensible	SERV	Service
SF	Square Feet Supply Fan	SGL	Single
		SG, SAG	Supply Air Grille
SH	Sheet	SHT	Sheet
SING	Single	SIM	Similar
SOL	Solenoid	SP	Static Pressure

SPEC(S)	Specification(s)		Space
SP.GR.	Specific Gravity		Single Pole
SQ	Square	STRUCT	Structural
SS	Stainless Steel Sanitary Sewer or Storm Sewer (See Legend)	ST SWP	Sound Trap, Single Throw Steam Working Pressure
STD	Standard	STL	Steel
STM	Steam	STOR	Storage
STR	Straight	STRL	Structural
SUP	Support(ed)	SUSP	Suspend(ed)
SW	Switch	SYS, SYST	System
T	Temperature, Total	T&B	Top and Bottom
TAB	Testing Adjusting & Balancing		Testing & Balancing
		TOT	Total
TD	Temperature Difference	TDH	Total Dynamic Head
TEFC	Totally Enclosed Fan Cooled	TEMP	Temperature Temporary
TERM	Terminal	THK	Thick
THRU	Through	TYP	Typical
TG, TAG	Transfer Grille		
U	Overall Heat Transfer Coefficient	UC	Undercut
		UGND	Underground
UH	Unit Heater	UR	Urinal
UTIL	Utility, Utilities	UV	Ultraviolet Unit Ventilator
V	Volts, Vent Vertical, Velocity	VAC	Vacuum
VCP	Vitrified Clay Pipe	VEL	Velocity
		VENT	Ventilat(or), (ion), (e)
VERT	Vertical		
VOL	Volume	VSP	Vitrified Sewer Pipe
VTR	Vent Thru Roof		
VUH	Vert. Unit Heater	VSD, VFD	Variable Speed Drive
W	Waste, Water Watt, West, Width	W/	With
		WB	Wet Bulb
WC	Water Column Water Closet	WOG	Water, Oil or Gas
WG	Water Gauge	WH	Wall Hydrant
WL	Water Level	WO	Waste Oil
W/O	Without	WP	Working Pressure
WSHP	Water Source Heat Pump	WT	Weight
		WTR	Water
XFMR	Transformer	XBRA	Cross Bracing
XT	Expansion Tank	XFER	Transfer
XA	Transfer Air		

YD	Yard	YH	Yard Hydrant
YR	Year		
Z	Impedence		

C. Organizational Acronyms:

AFSA	American Fire Sprinkler Association
AGCA	Associated General Contractors of America
AIA	American Institute of Architects
AIC	American Institute of Contractors
AIM/R	Association of Industry Manufacturers Representatives
AISETF	Association of Independent Scientific, Engineering, and Testing Firms
ANSI	American National Standards Institute
APFA	American Pipe Fittings Association
ASA	American Supply Association
ASME	American Society Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
AUCA	American Underground Construction Association
AWS	American Welding Society
AWT	Association of Water Treatment
AWWA	American Water Works Association
BOCA	Building Officials & Code Administration International, Inc. (ICC)
CDA	Copper Development Association Inc.
CISPI	Cast Iron Soil Pipe Institute
CS	Commercial Standards (sometimes known as commodity standards') produced by the U.S. Department of Commerce
CSI	Construction Specifications Institute
FM	Factory Mutual System
FS	Federal Specification
IAPMO	International Association of Plumbing & Mechanical Officials
ICBO	International Conference of Building Officials
ICC	International Code Council
IRI	Industrial Risk Insurers (Formerly FIA)
ISO	International Standards Organizations
MCAA	Mechanical Contractors Association of America, Inc
MIL	Military Specifications
MSS	Manufacturer's Standardization Society of the Valves and Fitting Industry
NAPCA	National Association of Pipe Coating Applicators
NAPF	National Association of Pipe Fabricators
NBS	National Bureau of Standards
NEC	National Electrical Code (NFPA 70)
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFSA	National Fire Sprinkler Association, Inc.
NIBS	National Institute of Building Sciences
NIST	U.S. National Institute of Standards and Technology
NSAE	National Society of Architectural Engineers
NWSA	National Welding Supply Association
OSHA	Occupational Safety and Health Administration or Occupational Safety and Health Act
PPI/HTPD	Plastic Pipe Institute, High Temperature Plastics Division

PS	Product Standard, produced by U.S. Department of Commerce
SFPE	Society of Fire Protection Engineers
UL	Underwriters Laboratories, Inc.

D. Technique:

1. Welding Pressure Piping - ASME

1.06 SUBMITTALS

A. Refer to Division 1 for submittal procedures and references.

B. Otherwise, submit 8 to 12 copies of information to the Engineer for approval. Check each Specification Section for all items to be included

C. Submit all required items within sixty (60) days of Contract date or Notice to Proceed, whichever is later, unless otherwise specifically instructed. Approval of the Engineer must be obtained to submit later on any item.

D. Submittals are required for all items of mechanical equipment and products provided by the Contractor which are called out in individual sections of the specifications. In general, do not submit product data on pipe, pipe fittings, sheet metal, sleeves, lubrication or packing unless specifically directed in these Contract Documents, but do submit schedules listing materials to be used.

E. All drawings or other material submitted on sheets larger than 8 1/2" X 11" (or 11" X 17" foldout) shall be submitted as one set of paper sepia or mylar sepia reproducibles and one set of blueline prints. Corrections and approvals will be indicated on the sepias and returned to the Contractor for copying and distribution.

F. Submittals shall be referenced correctly to the appropriate Sections of the Specifications.

G. Manufacturer's catalog cuts, instead of complete shop drawings, may be submitted for all standard cataloged equipment, provided that the item required to meet the project specifications is not modified in any way from the standard catalog version of said item. Cuts shall be clearly marked to indicate the version of said item, including the exact size, type, rating, capacity, accessories, etc., of the item to be furnished. Do not use the term “furnished by others” or similar designations, as this may imply that the item is not being provided in the Contract.

H. No faxed (Facsimile Transmitted) material will be accepted for submittals and all drawings and text shall be clear original printed material or low-generation copies with no blurred, blotched or unreadable areas.

I. Bind shop drawings/catalog cuts in folders with a title sheet and identification on front of the folder. Allow space for Contractor, Architect and Engineer review stamps.

J. All submittals must bear the dated, handwritten signature of the Contractor and his stamp of approval before being considered for review.

K. See additional requirements in individual Sections of these Specifications.

1.07 SAMPLES AND MOCK-UPS

A. Samples of any product called for by individual sections of the specifications shall be delivered to the Engineer at the time of submittal on that item. Submittals, in those cases, will not be approved until the samples have been examined.

B. Where called for in the specifications, the Contractor shall construct a sectional mock-up of equipment installations using actual equipment or equipment cabinets of the type to be used for purposes of checking appearance, fit of piping, ductwork, controls or structural elements. Mock-ups shall be inspected and approved by the Engineer prior to release for shipment of the material in question.

1.08 CERTIFICATES, LICENSES AND FEES

A. The Contractor shall pay all fees, stand all required inspections, obtain all necessary licenses, and obtain all required certificates for the work at his own expense.

B. Certificates requiring display shall be suitably framed and mounted in the mechanical room or other appropriate location. Copies of the certificate shall be included in each copy of the maintenance and operating manuals.

C. Certificates not requiring display shall be delivered to the Engineer for transmittal to the Owner, and copies of the certificate shall be included in each copy of the maintenance and operating manuals.

1.09 PROJECT RECORD DOCUMENTS

A. Record Drawings

1. Comply with Division 1 for record document procedures and requirements.

2. Maintain and protect one complete set of drawing prints on job site to record any deviations from Contract drawings.

3. Neatly and correctly enter with multicolored pencils any deviations on drawings and keep drawings available for inspection.

   a. Record locations of concealed ducts, piping and valves.

   b. Record Addendum and Change Order items.

4. Record deviations made necessary to incorporate equipment different from base equipment specified.

5. Drawings shall be available at the site at all times for inspection by the Engineer during normal project working hours.

6. At completion of Project and before final approval, make any final corrections to drawings, certify to the accuracy of each print by signature thereon and deliver same to Engineer for approval and drafting.

7. Underground site utilities shall be located by survey. Actual inverts and elevations shall be recorded.

1.10 MAINTENANCE AND OPERATING MANUALS

A. Submit four (4) bound copies, 8-1/2" x 11", in hard back 3-ring binders to the Engineer for review and obtain receipt for delivery.

B. Format of the manual shall be as follows:

1. First page, Each Volume: Title of Project, Owner, Address, Date of Submittal, Name and Address of Contractor, Name of Engineer.

2. Second page, Each Volume: Index of manual contents.

3. First section: A copy of each shop drawing and reviewed submittal with an index at the beginning of the section. Include operating and maintenance instructions, wiring/control diagrams, spare parts lists for each type of equipment.

4. Second section: A list of all major equipment used on the job, together with supplier's name and address and servicing agency's name and address.

5. Third section: Copies of Contractor and manufacturer warranties.

6. Fourth section: Test and balance reports, construction test reports, start-up reports, water treatment reports.

7. Fifth section:

a. Include a list of any special keys, tools and wrenches required for operation.

b. Include a list of all lubrication procedures, special lubricants and equipment.

c. Include a list of all tagged valves with tag number, valve description, location, and function. Include a revised flow chart, obtained from the Engineer to show valve identification.

C. No faxed (Facsimile Transmitted) material will be accepted for M & O submittals and all drawings and text shall be clear original printed material or low-generation copies with no blurred, blotched or unreadable areas.

D. Final payments cannot be made and Project cannot be closed out until Maintenance and Operating Manuals have been approved.

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules to avoid conflict with work and site conditions.

1 Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and approved submittals, and that products are properly protected and undamaged.
3. Provide equipment and personnel to handle products by methods to prevent soiling and damage to products or packaging.

B. Store products in accordance with manufacturer's instructions with seals and labels intact and legible.

1. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

2. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specific conditions, and free from damage or deterioration.

3. Provide substantial coverings as necessary to protect installed products from damage. Remove when no longer needed.

1.12 ENVIRONMENTAL REQUIREMENTS AND EXISTING CONDITIONS

A. Locate existing utilities prior to beginning work. Reroute or replace existing utilities where necessary to permit installation of the work. Provide adequate means of protection during work operations. Repair existing utilities damaged during work operations to the satisfaction of the utility owner and at Contractor's expense.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during work operations, notify the Engineer immediately for procedure directions. Cooperate with utility companies in maintaining active utilities in operation.

C. Contractor shall not remove or disturb any known or suspected existing hazardous materials in buildings, above ground or underground, except work performed in compliance with EPA requirements, as instructed in this Contract, including, but not limited to, asbestos, lead-based paints, PCB's and radioactive materials. If such materials are encountered during the course of the Work, the Engineer shall be immediately notified and the materials shall be avoided.

D. All materials removed from the site including scraps, construction materials, excavated or demolished materials shall be disposed of in a legal manner.

1.13 WARRANTY

A. The Contractor shall guarantee all work, both labor and products against defects and failure under normal use for the period of one year from the official date of Substantial Completion, the date of official acceptance by the Owner or the date of occupation by the Owner of the complete project area, whichever is earliest. The Contractor shall leave the entire installation in complete working order and free from any and all defects in materials, workmanship or finish. He shall repair or replace at his own expense any part that may develop defects due to faulty material or workmanship during construction and the warranty period and shall guarantee also to repair or replace with like materials any existing work of the building or equipment which is damaged during the repairing of such defective apparatus, materials or workmanship. The signing of the Contract for this

Work, covered by these Documents of which they shall become a part, shall become a written guarantee on the part of the Contractor to carry out all the provisions of this Division of these Specifications.

B. Refer to Division 1 for other specific requirements.

C. Refer to each Section of Division 15 for additional requirements.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS, STANDARD PRODUCTS AND SUBSTITUTIONS

A. All material and equipment shall be new and in good condition. Refer to Division 1 for additional requirements.

B. Design is based upon a specific make and model of equipment. However, except where noted, the specifications are not intended to limit competition or the Contractor's option to use alternate products of equivalent concept, quality, and performance.

C. Products of alternate manufacturers listed may be substituted without approval prior to the Bid, if they are regularly catalogued items and meet the criteria of equivalence in concept, quality, and performance in the opinion of the Engineer. It is recommended that the opinion of the Engineer be solicited prior to the bid if there are any questions. This opinion does not guarantee approval of the submittals at a later time. In the case where the equipment is unfamiliar to the Engineer, all vendors desiring to furnish equipment other than that specified must submit, in addition to ordinary shop drawings, a complete verification specification for the substituted equipment along with catalogs, literature, wiring diagrams, piping diagrams, and a list of similar sized installations where the proposed equipment is installed. This information may be required to be presented immediately after the Bid and lack of information or of qualifications, as judged by the Engineer, may result in a Bid not being accepted.

D. All products which require submittals, whether design basis or otherwise accepted, must be formally approved by the Engineer before shipment to the job.

E. The Contractor is responsible for any and all costs for changes to the mechanical work or the work of other trades necessitated by the optional substitution of approved alternate equipment. Approval of alternate equipment or modifications to the plans by the Engineer are not to be construed as relief from this responsibility. In the case of significant modification to the design, the Contractor may also be required to pay for the cost of design review and/or redesign by the Engineer.

F. Listing: The successful bidder shall furnish to the Engineer within one hour of the Bid opening, or as indicated in bidding instructions, a list of all major items of mechanical equipment to be provided, indicating the manufacturer and the general type. List shall include all items of major equipment such as boilers, chillers, towers, pumps, tanks, air handlers, packaged equipment, controls, plumbing fixtures, or other items to which whole Sections of Specifications are devoted. Do not include piping, sheet metal, small specialty items or the like unless specifically requested. In addition, a list of all Subcontractors to be involved in the project shall be furnished to include, in addition to the prime mechanical contractor, as a minimum, the plumbing, pipe fitting, sheet metal, controls, water treatment, thermal balancing, insulating, fire protection and asbestos

removal subcontractors, as utilized in the project. Any list of required items included in the Bid Form, Instructions to Bidders or other Bid documents shall supercede these items. Changing manufacturers or subcontractors after the listing will not be acceptable, unless initiated by the Owner or the Engineer. Final acceptance of the bids is contingent upon submission and approval of these lists.

2.02 QUANTITIES AND COMPLETENESS

A. Items may be referred to as singular or plural on drawings and specifications. Contractor is responsible for determining quantity of each item.

B. All components required for the complete installation and legal, proper and safe operation of equipment and systems indicated in the Documents shall be provided by the Contractor. Optional accessory items shall be included only as specified.

2.03 TESTING AND CERTIFICATION

A. Conduct tests and adjustments of equipment as specified and necessary to verify performance requirements. Submit test data to the Engineer. Pay all fees involved in required testing of equipment.

B. Provide necessary personnel and testing instruments required to perform test(s) of installation.

C. Refer to individual Sections for additional requirements.

D. Submit copies of all test reports, manufacturer's certifications and inspection reports to the Engineer. Include copies of each in each copy of the Maintenance and Operating Manual (Section 15010, Paragraph 1.10).

2.04 NOISE AND VIBRATION

A. Equipment shall be free of unusual or excessive noise and vibration in the opinion of the Engineer. No amount of rattling of loose, improperly isolated or ill-fitting parts will be acceptable. Vibration transmitted to the structure shall be reasonable and within recognized and specified limits.

2.05 HAZARDOUS MATERIALS

A. No materials or products containing known regulated hazardous materials shall be used in the Project, including asbestos, paint containing lead or products containing PCB's in amounts grater than current standards allow.

B. No solder containing lead shall be used on the Project.

C. Chemical products used in the construction process or for water treatment purposes shall be used in a manner in complete compliance with all OSHA and EPA regulations and guidelines. Formal Material Safety Data (MSD) Sheets shall be provided for each product used and shall be posted in the work area most accessible to the place of use of the product. In addition, MSD sheets shall accompany and be attached to water treatment products from the time they arrive on site through the end of Warranty.

PART 3 - EXECUTION

3.01 TEMPORARY SERVICES

A. Refer to Division 1 for specific requirements, responsibilities and methods.

3.02 COORDINATION

A. The Contractor is responsible for sequencing of the work and coordination with all trades to prevent delays in the project. No extras will be allowed for changes made necessary by interference of work between trades.

B. Carefully check and coordinate location and level of all pipes, etc. Run preliminary levels and check with all trades so that conflicts in all locations may be avoided.

C. Unless otherwise indicated, coordinate all work with the arrival of materials on the site to prevent unnecessary delays between demolition or other preliminary phases of work and the installation of new materials. Periods of abandonment of work area, once work has begun shall be avoided unless necessary to allow other trades to complete their work.

D. The storage of materials on site shall be minimized. Materials delivered to the site far in advance of construction, and/or exposed to weather, mud or construction abuse for long periods, will not be eligible to be included in pay requests, and will be accepted for use in the project at the time of construction based upon condition at that time. Generally, rusted, beat-up products, including large equipment, will not be accepted for use.

3.03 INSPECTIONS

A. The Engineer or his representative may inspect the work at any time and for any reason, but, generally, inspections will be arranged to coordinate with phasing of the work and with regularly scheduled Project meetings. The Engineer will attempt to accommodate the Contractor where possible, but in general, it is the Contractor's responsibility to schedule the work in such a manner that inspections are not required more often than the regular meetings, except for substantial completion and final inspections.

B. No work shall be permanently concealed (underground, or any other inaccessible location) without being inspected by the Engineer or his representative, unless specific permission is granted to do so by the Engineer.

C. The Contractor shall supply lights, ladders, tools, equipment and assistance to the Engineer, as required, for performing inspections and verifying the operation of mechanical systems.

3.04 CONCRETE WORK

A. Provide all concealed concrete work required for Division 15, including but not limited to pipe anchors, foundations and encasement, and pads. Coordinate with other divisions. The Contractor shall locate, dimension and furnish sleeves and anchors as required.

B. Concrete shall conform to Division 3 requirements.

3.05 PROTECTION

A. Protect equipment and materials during construction from damage from water, dirt, welding and cutting, spatters, paint droppings, etc., by use of shield and drop cloths. Damaged equipment or materials shall be repaired or replaced by the Contractor. Rusting, corroded or damaged materials or equipment is not acceptable, whether installed or not.

B. Products stored outside or in unheated spaces shall be covered with water-proof drop cloths or tarpaulins. Condensation shall be prevented by heating and ventilating. Method shall be acceptable to the Engineer. (See Section 15010, Paragraph 1.11).

C. During construction, maintain all materials and equipment in an orderly manner.

D. Protect floors from soiling and damages caused by tools, chips, cutting oil, pipe compound, paint and the like.

E. The Contractor shall use OSHA-approved ladders and lifts for Division 15 work. Workmen shall not be allowed to stand or sit on the unprotected surfaces of insulation, equipment jackets, conduit, control panels or any other location not intended for traffic.

3.06 CUTTING AND PATCHING

A. Avoid cutting of concrete, masonry and other finished work by use of sleeves and inserts.

B. Perform cutting and patching required for installation of the work. Methods and procedures shall be acceptable to the Engineer. Obtain written permission before any cutting.

C. Cut holes through concrete, brick, tile, etc., when necessary, by rotary core drilling or masonry saw.

D. Damages, patches, or work in areas previously finished under the work of other Divisions shall be repaired at the expense of the Contractor and to the satisfaction of the Engineer.

3.07 CLEANING

A. Upon completion, ductwork, piping and equipment shall be thoroughly cleaned of dirt, grease, rust and oil, primed where necessary, and left ready for painting. Vacuum clean the inside and outside of fan plenums, air handling units and equipment cabinets. Vacuum clean coils and comb out damaged fins.

B. Clean galvanized piping and ductwork in exposed areas with diluted acetic acid.

C. Clean copper piping in exposed areas with emery cloth and solvent.

D. Clean gauges, thermometers, traps, strainers and fittings.

E. Install new filters in throwaway and replaceable filter frames. Properly clean permanent filters.

F. Upon completion of Work, the Contractor shall remove all resulting rubbish, debris, and surplus materials from the premises, together with all disused instruments and equipment and shall leave the site in a neat, clean, and acceptable condition as approved by Engineer. Contractor shall maintain Work areas of existing facilities in a reasonably clean condition on a daily basis, and shall not allow debris to create operational or safety problems for the Owner.

3.08 PAINTING AND FINISHING

A. Painting shall meet the requirements of Section 15099, when included in the Specifications. No painting or coating shall be done on surfaces already rusting without proper surface preparation.

B. Exterior insulation and coverings shall be cleaned and painted per Section 15099 or coated as specified and left ready for service identification. Consult Engineer for color to be used.

C. Ferrous metal exposed to weather shall be cleaned, primed, and painted per Section 15099. Consult Engineer for color to be used.

D. All ferrous fasteners, hardware, hangers, hanger rods exposed to weather shall be stainless steel, galvanized or cadmium plated. Plating must include threads and all other surfaces. Other fasteners shall be properly prepared and coated immediately after installation with black asphaltum.

E. Non-ferrous metals, stainless steel and plastic materials shall not be painted unless indicated in other Sections or Divisions or in the Drawings.

F. Factory finished equipment which has rusted or been damaged shall be replaced. Only after approval by the Engineer, may it be cleaned, primed, and entirely repainted the original color by the Contractor.

G. Interior insulation coverings shall be cleaned, sized if necessary, painted white and left ready for service identification. Exposed insulation inside finished areas shall match colors of nearby finishes, or color selected by the Architect.

H. Interior uninsulated ferrous piping, supports and hangers exposed to view shall be painted per Section 15099 in areas not finished under other Divisions of the Specifications. All items shall be painted white except for pipe designated to be color coded in other Sections. In finished areas, color shall be selected by Architect.

I. Clean interior surfaces of air ducts, and convector and baseboard heating cabinets, that are visible through grilles and louvers and cover with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

G. Paint insulated and uninsulated duct and piping, cabinets, louvers, boxes, hangers, brackets, collars, and supports where exposed to view in finished areas, except when prefinished or where painted under other Divisions.

H. Contractor is responsible for any damage to building or contents from painting process. Do not allow paint over any existing or new name or identification plates or tags. Mask off any warning or instructional stickers or tags on equipment while painting.

I. Wall mounted plumbing fixtures shall be caulked between fixture and wall or floor with caulking compatible with finish surfaces.

3.09 ACCESS

A. Equipment has been chosen to properly fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with Code requirements. Physical dimensions and arrangements of equipment to be installed shall be subject to Engineer approval. Submit shop drawings of equipment layout for approval where it does not comply with plans.

B. Space Requirements: In the preparation of Drawings, a reasonable effort has been made to include all equipment manufacturer's recommendations. Since space requirements and equipment arrangement vary according to manufacturer, the responsibility for initial access and proper fit rests with the Contractor. The final arrangement of equipment and service connections shall allow the unit to be serviced. This shall include space to pull motors, filters, coils, tubes, etc. Contractor shall demonstrate that proper access has been provided to inspectors.

3.10 CONSTRUCTION DIRT, DUST AND NOISE CONTROL

A. All cutting or drilling of concrete, masonry, steel or wood shall be performed with absolute control of dirt and dust resulting from the cutting or drilling operation. Workers performing operations or in the immediate vicinity shall wear OSHA approved protective equipment.

B. The Contractor is required to minimize construction noise levels in all locations adjacent to or in occupied areas.

C. The Owner reserves the right to prevent use of any tools which cause detrimental vibration or noise.

3.11 TRAINING

A. Training and instruction to the Owner shall be provided for all Division 15 equipment, systems and specialties. See individual Sections for additional specific requirements. Contractor shall submit a training agenda to the Engineer for approval, prior to Substantial Completion, including a proposed schedule, all items to be covered and who is to make the presentations. If the Owner chooses to decline training, or any part thereof, the Contractor will credit the Project for the cost of any unused hours of training and instruction. Contractor shall keep record of attendance at the training sessions and submit to the Engineer upon completion.

B. Instruction shall be based upon material in the Maintenance & Operating Manuals, described above, which shall be approved by the Engineer, prior to the training. Any supplemental information required shall be provided by the Contractor.

3.12 LEAKS

A. During the time period from date of Contract until termination date of the guarantee, Contractor shall be responsible for damages to the building, grounds, walks, roads, piping systems, insulation, electrical systems, refrigeration, heating, ventilating and air conditioning systems, building equipment, furniture, and other building contents caused by leaks in piping systems or equipment being installed or having been installed by him. All repair work shall be done as directed by, and in a manner satisfactory to the Engineer and at no cost to the Owner.

END OF SECTION

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SECTION 15011- SCOPE OF WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall provide a complete system of mechanical equipment and piping, to accomplish the building fire protection for multiple sites, as shown on the plans and described in the Specifications, including all provisions of Section 15010 and all site utility improvements. All labor, materials, apparatus, tools and appliances essential to the complete functioning of systems described and/or indicated herein, or which may be reasonably implied as essential, whether mentioned in the Contract Documents or not, shall be provided by the Contractor. In case of doubt as to the work intended, or in the event of need for explanation thereof, the Contractor shall call upon the Engineer for supplemental instructions.

B. Systems to be provided include but are not limited to:

1. Complete demolition of existing mechanical systems in renovation areas. Demolished systems become the property of the Contractor and shall be removed from the site and disposed of in a legal manner, unless otherwise indicated.
2. Complete water service for fire protection systems, as shown, including vaults, valves, backflow preventers, flow switches and all accessories and trim.
3. A complete system of mechanical identification.
4. See Division 2 and coordinate with any additional drainage or utilities work exterior to the building.

C. In providing the work described, all provisions of the Specifications and the Plans shall be adhered to, and the following work shall also be provided as a matter of course:

1. Coordination among all trades and subcontractors to accomplish timely and correct completion of the work.
2. All excavation, backfill and surface repair required for underground mechanical work.
3. All anchors, supports, curbs, frames, hangers and attachments for all mechanical work.
4. All hoisting equipment, staging, scaffolding, ladders, barricades, shores or similar equipment required to properly carry out work in accordance with accepted safety practices and regulations.
5. Any cutting, patching, sleeves, flashings, seals and repairs required to seal penetrations of structures by mechanical work.
6. Payment of all fees, obtaining all permits, passing all inspections and tests required by authorities having jurisdiction and providing all certificates of approval, for the timely completion of the work described in the Contract Documents and the delivery to the Owner of a completely functional facility, lien-free and suitable for occupancy.
7. Building Mechanical System Maintenance and Operating Manuals, extra materials and tools, as indicated in 15010 and other individual Sections of the Specifications
8. Instruction and training of the Owner's personnel in the operation of the system and a video taped record of same.
9. Warranty of all work for one year or as otherwise specified.

1.02 WORK INSTALLED BUT FURNISHED BY OTHERS

A. Meters shall be provided by the Contractor, but shall be supplied by the Bowling Green Utilities.

1.03 RELATED WORK

A. Division 2 - Site Work - Utility and Drain Piping

B. Division 3 - Concrete Work

END OF SECTION

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3162/wb/04047

SECTION 15012 - EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide excavation and backfilling for Division 15 work. Refer to Contract Drawings for details of specific trenching requirements.

B. Remove unusable excavated material from the site unless otherwise indicated. When requested, deposit any usable surplus material on site where directed by the Engineer.

C. Provide and maintain bracing, shoring or sheathing as required to safely support walls of excavations. Adhere to all OSHA requirements.

D. Provide and operate pumping equipment to keep excavations free of water. (No increase in contract price shall be allowed for ground water conditions.)

E. Protect existing utilities encountered, whether or not shown on drawings. Provide additional excavation and backfill where required to resolve conflicts in buried lines.

F. The Contractor is responsible for repairing and restoring to the satisfaction of the A/E all existing paving, fences, streets, curbs, walks, poles, trees, landscaping and sodded areas disturbed in the course of excavations.

1.02 RELATED WORK

A. Referenced Divisions

1. Division 2: Site Work.

2. Division 3: Concrete.

3. Division 4: Masonry.

1.03 REGULATORY REQUIREMENTS

A. Materials and work shall conform to requirements of the following standards:

1. Kentucky Department of Natural Resources, Division of Water.

2. Kentucky Department of Public Protection and Regulation, Plumbing Division.

3. Kentucky Department of Transportation.

4. Bulletin #202, Kentucky Department of Industrial Relations.

5. Local Utility Companies.

PART 2 - PRODUCTS

2.01 BEDDING AND BACKFILL MATERIAL

A. Sand or Pea Gravel: Use sand or pea gravel fill for trench backfill under floors, parking lots, walks and drives. Backfill all overexcavation to proper level with sand or pea gravel, thoroughly compacted.

B. Surplus earth may be used for backfill in yards and seeded areas of project upon approval of Engineer. No cinders, ashes, wood, large rocks, concrete or debris will be allowed in the backfill. Surplus excavation material not needed for backfill or elsewhere on the site shall be promptly removed from the site.

C. Buried piping and ductwork: Sand or pea gravel per Specifications CM310.02, Grading A, for trench width and 6" cover on pipes. Material specified in Division 2 for remaining backfill.

D. Concrete encasement: Piping and ductwork passing under footings, foundations and other locations as shown on drawings. Concrete shall conform to Division 3 requirements.

E. Underground tanks and interceptors: Pea gravel of naturally rounded particles not less than 1/8" and not more than 3/4" in diameter.

F. Concrete pad base: Granular material conforming to Division 2 requirements.

G. Whenever excavations are made through streets, lawns, sidewalks, parking areas, curbs, or other finished surfaces, replace such surfaces with material to match existing surfaces as approved by proper authorities, including reinforcing steel where required. All cuts shall be neatly done with saws or other accepted equipment of the trade.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Before beginning excavation work contact utility companies and request that they locate and stake buried piping, wiring, etc. Such piping, wiring, etc., shall be exposed by hand excavation prior to the use of power equipment.

B. Excavation shall be open cut from the surface unless otherwise indicated.

C. Hold trench width to a minimum.

D. Do not excavate utility trenches parallel to building footing closer than 3 ft. except by approval of the Engineer. When parallel trenches are required deeper than the building footings, the horizontal distance from the footing shall be equal to, or greater than 1-1/2 times the vertical distance below the footing, but in no case shall the horizontal distance be less than 3 ft., except by the approval of the Engineer.

E. Shoring of piping or ductwork in trench will not be allowed, unless specifically approved by the Engineer.

F. For earth bedding, mechanical excavation shall be held to 4" above final grade of trench. The remainder shall be shaped by manual excavation, so that piping or ductwork is fully supported on undisturbed soil. Bell joint holes shall be carefully excavated so that none of the load is supported by the bells or joints. Whenever, in the opinion of the A/E, the soil is unsuitable for supporting piping and appurtenances, provisions for proper foundations shall be made, and the Contract price adjusted accordingly. Earth bedding shall be used only where indicated - otherwise gravel bedding shall be provided.

G. Rock, soft shale, large boulders are expected to be encountered during excavation and must be removed to minimum 4" below bottom of pipes and bells, unless otherwise indicated. Backfill with specified material to provide pipe bedding.

H. Refer to instructions to Bidders. Unless unit prices are requested for rock removal, rock excavation will be bid on an "unclassified" basis, and the Contractor is responsible for all excavation, whether it includes rock or not. If unit prices are requested, rock removed must be measured by the Engineer before bedding, to determine the additional monies due to the Contractor.

I. Contractor shall check any site borings provided for ground water levels and type of material expected to be encountered in excavation and/or request permission for performing his own soundings before bidding.

3.02 PROTECTION

A. Protect excavations from frost and freezing by covering and heating as necessary.

B. Maintain trenches and excavations free of standing water.

C. Barricades and Signs: Provide adequate barricades, construction signs, torches, red lanterns, guards, etc., as required during the progress of excavation work. Observe all applicable regulations respecting safety provisions, sheathing, barricades, etc.

3.03 BACKFILLING

A. Backfill only when exact locations of lines and equipment have been recorded and tests and inspections are completed.

B. Backfill shall be free of masonry debris, cinders, rubbish, boulders, wood or other matter subject to decay.

C. Tamp and puddle in 6" layers to a point 24" above pipe, and 12" layers above this point. First 12" over piping, etc., shall be filled and tamped carefully by hand. Thoroughly compact as specified in Division 2.

D. Frozen backfill shall not be used.

E. Extend concrete encasement, where required, 6" around piping and ductwork, and 12" each side of footings or foundations.

F. Provide clay bulkheads, minimum 3 ft. long, across the trench at 100 ft. intervals, to resist the unnatural movement of ground water. Top of bulkheads to extend 6" above top of pipe or top of gravel backfill.

G. Unsuitable Materials: Where excavation is in rock, ashes, cinders, refuse or other unsuitable materials, make the trench 6" deeper and 12" wider than required for the piping and backfill with approved sand or pea gravel 6" deep. Provide 6" sand or pea gravel backfill around entire perimeter of pipe, duct or conduit.

3.04 ADDITIONAL REQUIREMENTS

A. Refer to Division 2 for additional requirements and the coordination of the work.

B. Refer to each Section for specific requirements for the various pipe materials and equipment.

END OF SECTION

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SECTION 15060 - PIPE AND PIPE FITTINGS - GENERAL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Pipe, fittings, and connections.

B. Unless otherwise indicated in the Documents, these specifications cover all mechanical piping on the Project, including site work. Should specifications for site mechanical piping appear in other Divisions of the Specifications, they shall supercede this Section for the exterior portion of the work only and the work of this Section shall only include piping to five ft. outside the building for those systems so specified.

1.02 RELATED WORK, AS INCLUDED

A. Section 15100 - Valves and Cocks - General

B. Section 15310 - Fire Protection Piping.

C. Division 15 - Equipment Sections

1.03 REFERENCES

A. Note that any one reference may not apply to a given portion of the work. See other Sections for piping types required for each system. References shall always be assumed to mean the current or most recent edition, unless otherwise indicated.

1. ANSI/ASME SEC. - Boilers and Pressure Vessels VIIID Code, Rules for Construction of Pressure Vessels, with addenda.

2. ANSI/ASME SEC. - Boilers and Pressure Vessels Code, IX Welding and Brazing Qualifications, with addenda.

3. ANSI/ASME B1.1 - Unified Screw Threads

4. ANSI/ASME B2.1 - Pipe Threads (Except Dry Seal)

5. ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, 25, 125, 250, and 800 pound

6. ANSI/ASME B16.3 - Malleable-Iron Threaded Fittings Class 150 and 300.

7. ANSI/ASME B16.4 - Cast Iron Threaded Fittings, Class 125 and 250.

8. ANSI/ASME B16.5 - Steel Pipe Flanges and Flanged Fittings

9. ANSI/ASME B16.9 - Factory-Made Wrought Steel Buttwelding Fittings

10. ANSI/ASME B16.11 - Forged Steel Fittings, Socket Welded and Threaded

11. ANSI/ASME B16.18 - Cast Copper Alloy Solder-Joint Pressure Fittings
12. ANSI/ASME B16.20 - Ring-Joint Gaskets and Grooves for Steel Pipe Flanges
13. ANSI/ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges
14. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
15. ANSI/ASME B16.24 - Bronze Pipe Flanges and Flanged Fittings
16. ANSI/ASME B16.25 - Buttwelding Ends for Pipe, Valves and Fittings.
17. ANSI/ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes
18. ANSI/ASME B18.2.1 - Square Head Bolts and Screws
19. ANSI/ASME B18.2.2 - Square and Hex Nuts
20. ANSI/ASME B31.9 - Building Services Piping
21. ANSI/ASME B36.10 - Welded and Seamless Wrought Steel Pipe
22. ANSI/ASME Z49.1 - Safety in Welding and Cutting
23. ANSI/ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc- Coated, Welded and Seamless
24. ANSI/ASTM A105 - Forgings, Carbon Steel, For Piping Components
25. ANSI/ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized), Welded and Seamless, for Ordinary Uses
26. ANSI/ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings
27. ANSI/ASTM A135 - Pipe, Steel, Black, Electric Resistance Welded
28. ANSI/ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
29. ANSI/ASTM A197 - Cupola Malleable Iron
30. ANSI/ASTM A216 - Steel Casings, Carbon, Suitable for Fusion Welding, For High Temperature Service
31. ANSI/ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
32. ANSI/ASTM A307 - Carbon Steel Externally and Internally Threaded Standard Fasteners
33. ANSI/ASTM A395 - Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures

34. ANSI/ASTM A795 - Specification for Black and Hot-dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Prevention Use

35. ANSI/ASTM B32 - Solder Metal, 95-5 (Tin-Antimony - Grade 95-5TA).

36. ANSI/ASTM B36.10M - Wrought Steel Pipe

37. ANSI/ASTM B75 - Seamless Copper Tube

38. ANSI/ASTM B88 - Seamless Copper Water Tube

39. ANSI/ASTM B251 - General Requirements for Wrought Seamless Copper and Copper Alloy Tube

40. ANSI/ASTM B813 - Fluxes for Soldering Applications of Copper and Copper Alloy Tube

41. ANSI/ASTM D1784 - Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds

42. ANSI/ASTM D2657 - Heat Joining of Thermoplastic Pipe and Fittings

43. ANSI/ASTM F442 - Specification for Special Listed Chlorinated Polyvinyl Chloride (CPVC) Pipe

44. ANSI/AWS A5.8 - Brazing Filler Metal (Class BCuP-3 or BCuP-4)..

45. ANSI/AWS D.1.1 - Structural Welding Code, Steel.

46. ANSI/AWS D10.9 - Specification for qualification of Welding Procedures and Welders for piping and Tubing.

47. ANSI/AWWA C105 - Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids

48. ANSI/AWWA C111 - Rubber Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings

49. ANSI/AWWA C151 - Ductile Iron Pipe, Centrifugally Cast 0in Metal Molds or Sand Lined Molds, for Water or Other Liquids

50. ANSI/AWWA C606 - Grooved and Shouldered Type Joints

51. The Copper Development Association Publication: Copper Tube Handbook

52. NFPA 51B - Standard for Fire Prevention in Use of Cutting and Welding Processes

53. FS WW-P-521 - Pipe Fittings, Flange Fittings, and Flanges: Steel and Malleable Iron (Threaded and Butt Welding) Class 150

1.04 QUALITY ASSURANCE

A. Codes and regulations referred to are minimum standards. Where the requirements of these Specifications or Drawings exceed those of the codes and regulations, the Drawings or Specifications govern.

B. Piping systems shall meet requirements of ANSI/ASME B31.9, Building Services Piping, ASME Boiler and Pressure Vessel Code, State Plumbing Code and Kentucky Building Code.

C. All plumbing work shall be accomplished by or under the direct supervision of a licensed plumber.

D. All fire protection work shall be accomplished by or under the direct supervision of a licensed sprinkler installer.

E. Welding Materials and Procedures: Conform to ASME Code and AWS standards referenced above. Employ certified welders in accordance with ASME Section 9, ANSI/AWS D1.1., ANSI/AWS D10.9 and Boiler Inspection Section, State Fire Marshal. Welders shall be certified under the rules of the National Certified Pipe Welding Bureau and qualified by either the National Certified Pipe Welding Bureau or an independent testing laboratory for the procedures used on this Project.

1.05 SUBMITTALS

A. In general, do not submit on ordinary pipe and fittings, except as noted in these Specifications.

B. See individual piping Sections for additional submittal requirements.

C. Submit a letter certifying that welders and welding procedures meet the requirements of AWS D10.9, Level AR-3.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide pipe and tubing systems of types called for in the individual piping system Sections of the Specifications. Provide materials and products meeting the standards referenced in those Sections and in Paragraph 1.03 above.

B. Provide work meeting the requirements referenced in this Section 15060 - Pipe and Pipe Fittings (General), and Section 15100 Valves and Cocks (General).

C. Provide all new materials in good condition, unless otherwise indicated in the Documents. Rusted, dented, bent or otherwise damaged pipe and fittings will not be accepted and shall be removed from the site as soon as discovered.

D. Provide piping system components with appropriate identification, rating or approval labels, stamps or symbols as required by Code or to show compliance with the requirements of these Documents. Unlabeled pipe, valves missing appropriate markings or any other non-identifiable items shall not be installed.

2.02 PRESSURE/TEMPERATURE RATINGS

A. Pressure/temperature ratings of all components and accessories shall meet or exceed design conditions for the system in which they are installed. All piping components, joints, valves, accessories and specialties shall be designed for operating conditions of not less than that indicated in individual piping Sections of the Specifications and shall be designed to withstand continuous use at the following conditions as a minimum:

1. Fire water service and distribution (F, FP): 175 psig and 125 deg. F.

2.03 PIPE AND FITTINGS

A. Where no detailed specification of pipe or fittings is given for a type of system, either in the Specifications or the Drawings, use the following general recommendations for material type.

1. Steel Pipe: ANSI/ASTM A53 Grade B, black; galvanized; Schedule 40 or as indicated. Steel Pipe Fittings: ANSI/ASME B16.3 or ANSI/ASTM A126. Weld fittings for black steel pipe shall be Tube Turns, Bonney Forge, Capital, or WFI, black steel butt welded type ASTM A234 Grade WPB of a service class to match the adjacent pipe, except that connections to valves shall be made with ASTM A105 welding neck flanges. Flanges shall have ASTM A307 Grade B bolts with hexagon heads and nuts and shall be provided with gaskets as specified and insulating sleeves where required.

2. Ductile Iron Water Pipe: ANSI/AWWA C151, Class 50, cement-lined, bituminous coated.

3. Copper Water Tube: ASTM B88, Type K soft temper underground direct bury, Type K hard drawn for underground prefab systems, Type L hard drawn in building; Types M, DWV only as indicated. Wrought Copper and Brass Pipe Fittings: ANSI/ASME B16.22, pressure fittings or ANSI/ASME B16.29, drainage fittings. Solder shall be 95/5 tin antimony or tin/silver alloy type. Flux shall be non-acid type, approved by solder manufacturer.

2.04 UNIONS, COUPLINGS AND JOINTS

A. Unions - Pipe Size Under 2 inches: 150 psi bronze ground joint malleable iron for threaded ferrous piping; bronze for copper or brass pipe soldered joints. No wrought copper unions shall be used above 3/4" pipe size.

B. Unions - Pipe Size Over 3 inches: 150 psi forged steel or cast iron slip-on, or weld neck flanges for ferrous piping; bronze flanges for copper or brass piping; synthetic rubber gaskets for gas service.

C. Unions - Pipe Sizes 2 and 2 1/2 inch: Either of the types in A. and B.

D. Dielectric Unions: Vogt, Dart, Capitol or approved equal dielectric insulated unions for all copper to ferrous metal connections.

E. Dielectric flanges: Provide flange insulation kit for each copper to ferrous joint or as otherwise shown. Include electrically insulating gaskets, inserts and washers as required for complete isolation.

F. Couplings: Threaded steel pipe - Provide malleable iron sleeve coupling with right hand pipe thread on each end, standard or extra heavy as required for service.

G. Couplings: Copper pipe - Provide copper sleeve coupling with shoulder, socket sized for sweat connection or brazing.

H. Welded Joints: Provide joints in steel pipe executed by a properly certified pipe welder. Provide welding as required per Part 3 of this Section.

I. Grooved and Shouldered Pipe Ends: Malleable iron housing clamps to engage and lock, designed to permit some angular deflection, contraction and expansion; C-shape composition sealing gasket, steel bolts, nuts and washers; galvanized couplings for galvanized pipe.

PART 3 - EXECUTION

3.01 GENERAL

A. Joints in pipe and tubing shall be cut square with tubing or pipe cutter. Ends shall be reamed. Remove burrs. Bevel plain end ferrous pipe.

B. Remove filings, dust, scale and dirt, inside and outside, before assembly. Open ends of pipelines or equipment shall be properly capped or plugged during construction, until installation, to keep dirt and other foreign materials out of system.

C. Remove welding slag, splatter or foreign material from pipe and fitting materials before assembly and after joining.

D. Pipe shall be cut accurately to measurements established at the job site and worked into place without springing or forcing, and properly clearing all windows, doors, and other openings.

E. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted without written approval. Supports shall be attached only to structural framing members and concrete slabs. Supports shall not be anchored to metal decking unless approved in writing. Where supports are required between structural framing members, suitable intermediate metal framing shall be provided and approved by the Engineer. Supports shall conform to Section 15090 - Hangers, Supports and Anchors.

F. Changes in direction shall be made with fittings unless otherwise indicated. Bent pipe showing kinks, wrinkles, flattening or other malformations will not be accepted.

G. Provide reducing fittings for changes in pipe sizes. Reducers (increasers) shall be concentric unless eccentric fittings are indicated or required for proper drainage.

H. Pipes shall be installed to permit free expansion and contraction without damage to joints or hangers. Expansion in the piping shall be accommodated by means of expansion loops and offsets or by expansion joints as indicated in the Documents. Refer to Section 15095 - Expansion Compensation and Vibration Elimination.

I. Flanges and unions shall be faced true. Flanges shall be provided with gaskets suitable for the fluid used and made square and tight. Except where copper tubing is used, unions or flange joints shall always be provided in each line immediately preceding the

connection to each piece of equipment or material requiring maintenance such as coils, pumps, valves, and other similar items unless such items have integral flanges or unions.

3.02 COPPER PIPE CONNECTIONS

A. Form hot soldered joints in copper, brass, or bronze fittings with 95-5 solder for plumbing. Do not use for refrigeration or fuel lines. 50-50 solder or other lead-bearing solder shall not be used. Joints shall be soldered, using flux, with solder applied and drawn through the full fitting length. Excess solder shall be wiped from joint before solder hardens.

B. Joints for copper-copper, copper-brass, copper-bronze, shall be brazed where shown with specific alloy filler indicated (ANSI/AWS A5.8). During all brazing operations, the tubing and fitting being brazed shall have a continuous purge of dry nitrogen at a rate which will preclude oxidation of the tubing and fitting. All tubing and fittings shall be properly cleaned prior to brazing. All copper tubing joints that are assembled on the job site shall be assembled with fittings.

C. Joints for copper tubing may be made with flare fittings where indicated.

D. Work into place without forcing or springing.

3.03 STEEL PIPE CONNECTIONS - THREADED

A. Screw joint steel piping up to and including 1-1/2 inch, unless otherwise indicated. Weld piping 3 inch and larger, including branch connections. Screw or weld 2 or 2-1/2 inch piping.

B. Die cut screwed joints with full cut standard taper pipe threads, using cutting oil appropriate for operation.

C. Assemble with teflon paste joint compound applied to male threads only, unless otherwise indicated. Non-toxic compound shall always be used for water service piping.

3.04 STEEL PIPE CONNECTIONS - WELDED

A. Screw joint steel piping up to and including 1-1/2 inch, unless otherwise indicated. Weld piping 3 inch and larger, unless otherwise indicated, including branch connections. Screw or weld 2 or 2-1/2 inch piping.

B. Welding procedures shall be in accordance with ANSI/ASME B31.9 for the service involved. Welds shall be full penetration type, accomplished by proper beveling and spacing of pipe ends. Where backing rings are specified herein, root pass shall penetrate into the backing ring.

C. No field fabrication of jointed fittings, mitering or notching pipe to form elbows and tees or direct welding of pipe to pipe will be allowed unless specifically shown, except for buttwelding of properly aligned and prepared straight pipe sections.

D. Provide factory weld fittings for all turns in pipe. Weld bends may be field cut to proper angle as required for fit.

E. Provide manufactured weld tee fittings for branches from a main line which are main size or one size less for up to 6" pipe and for main size or up to two sizes less for 8 inch and larger mains, unless otherwise indicated. Take-off or saddle fittings such as "Weld-o-lets", "Thread-o-lets", "Latrolets", "Sweepolets", and "Elbolets" and the like may be used for smaller branch piping unless otherwise indicated. Do not project branch pipes or take-off fittings inside the main pipe.

F. Field and shop bevels shall be in accordance with the standards specified herein and shall be done by mechanical means or flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of slag, scale and oxidation prior to welding.

G. Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be aligned so that no part of the pipe wall is offset by more than 20% of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operations. Connections larger than 6" shall be made with backing rings at welds.

H. Where the temperature of the component parts being welded reaches 32°F or lower, the material shall be heated to approximately l00°F for a distance of 3' on each side of the weld before welding, and the weld shall be finished before the material cools to 32°F.

I. Welders shall stamp each weld with their personal symbol or code number.

J. A random sample of completed pipe field welds may be chosen by the Engineer for non-destructive testing by an independent testing agency, not to exceed 5% of the total welds on the project. Costs for testing shall be borne by the Contractor. Test criteria shall be as specified by ANSI/ASME B31. If any of the tested welds are unsatisfactory, additional welds may be chosen for testing at the Contractor's expense. Defective welds shall either be cut out and rewelded or ground down to base metal and rewelded. All reworked welds shall be tested as specified herein.

3.05 STEEL PIPE CONNECTIONS - GROOVED

A. Groove type coupling system may be used wherever this piping type is specified as an option in the individual piping Sections listed in Paragraph 1.02.

3.06 CAST IRON PIPE CONNECTIONS

A. Joints for Bell and Spigot Pipe: Neoprene gasketing system.

PART 4 – SUBMITTALS

4.01 SUBMITTAL SCHEDULE

A. In accordance with the requirements of the General and Special Conditions and Section 15010, the following information is required to be submitted for this Section. The Contractor shall submit the specified copies of the required information to the designated party for approval within 30 days after Notice to Proceed.

Item Description	Shop Drawings	Product Data	Schedules	Installation Data	Parts Lists	Wiring Diagram	Samples	O & M Manual	Certificates	Warranty	Report	Other
Welder									X			
Welding Procedures									X			
Special Piping *	X	X	X	X	X		X	X		X		

* Including but not limited to: pre-insulated piping systems, acid-waste piping, victaulic-type or mechanical –joint systems, containment piping systems.

END OF SECTION

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SECTION 15100 - VALVES AND COCKS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Gate valves.

B. Globe or angle valves.

C. Check valves.

D. Plug cocks.

E. Ball valves.

1.02 RELATED WORK

A. Division 15 - Equipment Sections

B. Section 15060 - Pipe and Pipe Fittings (General)

C. Section 15310 - Fire Protection Piping.

1.03 REFERENCES

A. AWWA C500 - Gate Valves, 3 through 48 inch NPS, for Water and Sewer Systems.

B. MSS SP-70 - Iron Body Gate Valves.

C. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.

D. MSS SP-110 - Ball Valves.

1.04 SUBMITTALS

A. Submit copies of valve ordering schedule for approval before ordering valves.

B. Submit detailed shop drawings under provisions of Section 15010. Clearly indicate make, model, location, type, trim, size, pressure rating and optional features.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide valves of same manufacturer throughout where possible.

B. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

C. Provide valves as manufactured by Stockham, Lunkenheimer, Crane, Powell, Kennedy, Hammond, Nibco, Watts, Grinnell, Homestead, Conbraco, Keystone, Mueller or approved equal.

2.02 VALVE CONNECTIONS

A. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use valve sizes same as pipe.

B. Valves 2 inches and smaller shall be threaded type, unless otherwise shown. Use threaded adapters for sweat copper construction. Do not use sweat-type valves.

C. Valves 3" and larger (4" and larger on Domestic Water) shall be flange connected type, unless otherwise shown.

D. Valves 2 1/2" (or 3" on Domestic Water) may be either screwed or flanged.

E. Use grooved body valves with mechanical grooved jointed piping, where indicated.

2.04 VALVES - GENERAL

A. Unless otherwise indicated in individual piping Sections, valves shall meet the following minimum standards:

B. Unless otherwise indicated, use Class 125 valves suitable for minimum 125 psig WSP and 400 degrees F. Valves for fire protection shall be suitable for 175 psig WOG (See Section 15310).

C. For smaller domestic water piping, screwed gate, globe and check valves with supply pressures over 100 psi shall be valved with Class 150. For lower pressures, Class 125 may be used. For Larger lines, AWWA cast iron valves shall be used, rated 200 or 150 psig non-shock c.w.

D. Provide rising stem (R.S.) or outside screw and yoke (O.S.& Y.) valves unless otherwise designated. Buried valves, or valves in shallow pits or manholes, shall be non-rising stem (N.R.S.).

2.03 SCREWED-CONNECTION VALVES FOR GENERAL SERVICE

A. Ball Valves: Valves shall be rated 125 psi SWP and 400 psi non-shock WOG, minimum, 2-pc., end-loaded, cast bronze bodies, TFE seats, standard port, separate packnut with adjustable stem packing, anti-blowout stems and stainless steel, chrome-plated brass or bronze ball. Provide 3-piece cartridge and/or full port design where indicated. Valve ends shall have full ANSI threads and be manufactured to comply with MSS-SP110. Lever operator shall be plated and/or polymer-coated. Where piping is insulated, ball valves shall be equipped with 2" extended handles of non-thermal conductive material or provide a protective sleeve that allows operation of the valve without breaking the vapor seal or disturbing the insulation. Memory stops, which are fully adjustable after insulation is applied, shall be included where indicated. Valves for gas service shall be in

compliance with NFPA 54 and listed by UL, meet the requirements of AGA and the local fuel supplier.

B. Gate Valves: Valves shall be Class 125 or 150, union bonnet, rising stem, inside screw, split wedge and manufactured in accordance with MSS-SP80. Body, bonnet and wedge shall be of bronze per ASTM B-62. Stems shall be of dezincification-resistant silicon bronze, ASTM B-371 or low-zinc alloy, B-99, non-asbestos packing and malleable or ductile iron handwheel.

C. Swing Check Valves: Valves shall be Y-pattern swing type manufactured in accordance with MSS-SP80, Class 125 or 150, bronze ASTM B-62 body with TFE seat disc.

2.04 FLANGE CONNECTED VALVES FOR GENERAL SERVICE

A. Gate, Globe/Angle Valves: Valves to be Class 125 or 250, manufactured in accordance with MSS-SP70 (gate) or MSS-SP85 (globe/angle), flanged, bolted bonnet, OS&Y, iron body, bronze mounted (IBBM), with body and bonnet conforming to ASTM A126 Class B cast iron. Packing and gasket shall be non-asbestos.

B. Swing Check Valves: Valves shall be swing-type manufactured in accordance with MSS-SP71, Class 125 or 250, flanged ASTM A126 Class B cast iron body with bronze trim, non-asbestos gasket.

C. Ball Valves: Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals, lever handle, Class 125/150 flanges, 125 PSI SWP, 400 PSI W.O.G.

D. Gate valves 3"-48", flanged or mechanical joint, for domestic water and sewer applications shall meet AWWA C500 requirements and be rated for minimum 150 psig non-shock c.w.

E. Check valves 4" -12", flanged or mechanical joint, for domestic water or sewer applications shall be AWWA type, rated for minimum 150 psig non-shock c.w., and shall include outside lever and weight or spring for pumping applications and others indicated.

2.05 WATER VALVES FOR FIRE PROTECTION SERVICE

A. Provide valves as specified in Section 15310, Fire Protection piping.

2.06 PLUG COCKS FOR WATER AND GAS SERVICE

A. Bronze body, bronze plug with square head, screwed ends. Rated for steam or water service as required.

2.08 VALVE OPERATORS

A. Provide suitable handwheels for gate, globe or angle valves.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install valves with stems between upright and horizontal, not inverted or below horizontal.

B. Install gate valves for shut-off and isolating service, to isolate equipment, parts of systems, or vertical risers.

C. Install globe or angle valves for throttling service and control device or meter by-pass.

PART 4 – SUBMITTALS

4.01 SUBMITTAL SCHEDULE

A. In accordance with the requirements of the General and Special Conditions and Section 15010, the following information is required to be submitted for this Section. The Contractor shall submit the specified copies of the required information to the designated party for approval within 30 days after Notice to Proceed.

Item Description	Shop Drawings	Product Data	Schedules	Installation Data	Parts Lists	Wiring Diagram	Samples	O & M Manual	Certificates	Warranty	Report	Other
Valves and Cocks		X	X		X			X				

END OF SECTION

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SECTION 15190 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Identification of mechanical products installed under Division 15.

1. Exterior mechanical piping systems.

1.02 REFERENCES

A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 15010.

B. Submit list of wording, symbols, letter size, and color coding for mechanical identification. Include copies in project manuals.

C. Submit manufacturer's installation instructions under provisions of Section 15010.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Brady, Seton, Craftmark or approved equal per Section 15010.

2.02 MATERIALS

A. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on white contrasting background color.

B. Underground Plastic Pipe Markers: Bright colored continuously printed polyethylene plastic ribbon tape of not less than 6 inch wide by 4 mil thick, manufactured for direct burial service. Tape shall contain magnetic detector strip and text in contrasting color containing warning to excavators.

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean unpainted surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners and adhesive. Mount in location where tag may properly be read from the floor.

B. Underground Pipe Plastic Warning Tape: Install continuously along length of piping, 6 to 8 inches below finished grade and/or 12" to 18" directly above buried pipe, before final backfilling. Install for:

Fire protection.

3.03 APPLICATION

A. Equipment: Provide plastic nameplates to identify water treatment devices and other items identified by mark designations in Documents.

END OF SECTION

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SECTION 15310 - FIRE PROTECTION PIPING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide pipe, fittings, valves, accessories and connections required for the complete installation of all fire protection water supply, as described in the Drawings and other Sections of the Specifications. All work shall comply with appropriate NFPA Standards.

B. Provide all work on fire water piping, except as may be indicated in Division 2 or on plans.

1.02 RELATED WORK

A. Division 2 - Site Work (Excavation and Backfill)

B. Section 15330 - Fire Sprinkler Systems.

1.03 REFERENCES

A. NFPA-13 - Installation of Sprinkler Systems, currented.

B. NFPA-24 - Private Fire Service Mains, current ed.

C. Section 15012 - Excavation and Backfill.

D. Section 15060 - Pipe and Fittings.

E. Section 15100 - Valves and Cocks.

F. Section 15190 - Mechanical Identification.

G. Kentucky Building Code.

1.04 QUALITY ASSURANCE

A. Installing firm shall be an experienced company, regularly engaged and specializing in the installation of sprinkler and fire protection systems with a minimum of three years of organizational (not personal) experience in design and installation of projects of similar size and scope. The company shall hold a current competency certificate issued by the Commonwealth of Kentucky. Work shall be under the direct supervision of a Licensed Sprinkler Installer.

B. Any pipe sizes shown on the plans shall be considered minimum allowable and shall be used in the design unless, for some reason, they are in conflict with some provision of the Code. Otherwise, pipe sizing shall meet the minimum requirements of all applicable codes. Vaults, Fire Dept. Connections and the like, if included, shall be installed reasonably close to locations shown on Plans, unless there is a code conflict or approval is obtained from the Engineer to relocate.

C. Unless noted otherwise in the Documents, all materials shall be new and free from defects.

D. Equipment, materials and accessories shall all bear the UL and/or FM label and shall be UL listed and FM approved for the service intended, where such listing exists.

E. Materials and equipment used for similar applications shall all be the products of one manufacturer, unless noted otherwise in the Documents.

F. All welders and welding procedures shall be qualified according to the American Welding Society AWS D10.9-Current Edition, Level AR-3.

1.05 REGULATORY REQUIREMENTS

A. Design, materials and installation shall conform to all appropriate provisions of NFPA 13, NFPA 24.

B. Conform to applicable sections of the Kentucky Building Code for fire protection systems.

C. Submit plans, data, approved and stamped by the Engineer, to the State Fire Marshal's office, or other authority having jurisdiction, for approval as indicated below. Work shall not proceed until such approval is obtained and a copy transmitted to the Engineer.

D. Work shall be under the direct supervision of a Licensed Sprinkler Installer.

E. Minimum pressure rating of all piping system components is 175 psig water, unless otherwise indicated.

1.06 SUBMITTALS

A. Submit shop drawings and product data as one package per Section 15010 and include the following: Exterior piping materials, jointing methods, hangers and supports, floor and wall penetration seals, valves, check and backflow valve assemblies, mechanical ID (Section 15190), piping specialties and accessories, pipe and valve data and ratings, and all other accessories.

B. Submit detailed piping layout, referenced to building, showing piping, weights, hangers and supports, control components and accessories, scale no smaller than 1/8"= 1 ft. All drawings submitted on sheets larger than 8 1/2" X 11" shall be submitted as one set of black and white or blueline prints. Corrections and approvals will be indicated on the prints and returned to the Contractor. Drawings shall be stamped by the system designer.

C. Submit plans, data and calculations, approved and stamped by the Engineer, to the State Fire Marshal's office, or other authority having jurisdiction, for approval and obtain permit. Submit one copy of Government-stamped approved drawings and calculations for record to the Engineer. Work shall not proceed until such approval is obtained and a copy transmitted to the Engineer. Calculations and plans shall be done by a Licensed Sprinkler Layout Technician or a Licensed Professional Engineer.

1.07 PROJECT RECORD DOCUMENTS

A. Submit complete "as-built" documents under provisions of Section 15010.

B. After installation, inspection and tests are complete, submit to Engineer and to the authority having jurisdiction, the Contractor's Material and Test Certificates for above and/or underground piping, as required by NFPA 13, before request for final payment. All data shall be typed and documents shall bear the required signatures.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 15010.

B. Include written maintenance data on all components of system, with servicing requirements and parts lists.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials and equipment in shipping containers with labeling in place under provisions of Section 15010.

B. Provide temporary inlet and outlet caps for all piping connections. Maintain caps in place until installation.

PART 2 - PRODUCTS

2.01 PIPE AND TUBE

A. General - Markings on all pipe and tube shall be distinct and shall be inspected prior to painting or concealment.

B. Exterior Underground Piping

1. Ductile iron pipe: thickness Class 50 with cement lining and bituminous coating. Pipe shall meet ANSI/AWWA C151/A21.51-Current. Joints shall be gasketed mechanical joint type meeting ANSI/AWWA C111/A21.11-Current.

2. PVC Pipe: PVC water main (Section 15060) as currently approved by local water company.

2.02 PIPE FITTINGS

A. Underground Ductile Iron Fittings: Cement-lined ductile iron with mechanical joint connections. Working pressure shall be at least 250 psig. Fittings shall meet ANSI/AWWA C153/A21.53-Current and ANSI/AWWA C104/A21.4-Current (AWWA C110).

B. Underground PVC water main fittings as approved by local water company and authority having jurisdiction (Section 15060).

C. Steel Fittings: ANSI B16.9, wrought steel, buttwelded; ANSI B16.25, buttweld ends; ASTM A234, wrought carbon steel and alloy steel; ANSI B16.5, steel flanges and fittings; ANSI B16.11, forged steel socket welded and threaded. UL listed factory fabricated welded outlets, with foundry mark. No other type of welded outlet or welded fittings shall be used. Mitered or field-fabricated fittings are not permitted.

D. Malleable Iron Fittings: ANSI B16.3, screwed type; ASTM A47.

E. Cast iron fittings: standard weight fittings, UL rated for 175 psig. Fittings shall meet ASTM A126-Current. Threaded fittings shall meet ANSI/ASME B16.4-Current. Flanged fittings shall meet ANSI/ASME B16.1-Current. Gaskets for flanged fittings shall be full-face type of red sheet rubber.

F. Grooved joints and fittings: grooved mechanical fittings and couplings using an elastomeric gasket enclosed by a split malleable or ductile iron housing. Malleable iron shall meet ASTM A47-Current. Ductile iron shall meet ASTM A536-Current. Self-grooving couplings and fittings employing set screws or plain end pipe shall not be used. Mitered or segment-welded fittings shall not be used.

2.03 JOINT MATERIALS

A. Threaded Joint Compound: ANSI B2.1.

B. Tie rods and clamps: 3/4" carbon steel rods with bolts and washers.

C. Thrust blocks: concrete poured against undisturbed earth, per details and Specifications.

2.04 UNIONS, FLANGES, AND COUPLINGS

A. Unions: 150 psi malleable iron for threaded ferrous piping.

B. Flanges: 150 psi forged steel slip-on flanges for ferrous piping.

C. Mechanical Grooved Couplings: UL and FM approved.

2.05 VALVES

A. Manufacturers:

1. Design basis: Kennedy

2. Alternates: Clow, Conbraco, Crane, Grinnell, Jenkins, Lunkenheimer, Mueller, Nibco, Powell, Stockham, Victaulic, Walworth or approved equal per Section 15010. Sprinkler company valves may be provided if above standards are met.

3. All valves of each valve type furnished shall be by the same manufacturer.

B. General

1. See Section 15100 for additional information.

2. Trim valves: gate, globe, angle, and check valves used for trim in the fire protection system shall be bronze construction with threaded connections. Valves shall have a minimum 175 psig working pressure.

3. Valve size, working pressure, and the manufacturer's name or trademark shall be permanently affixed to the body of all valves. Drain and test valves may be otherwise marked and gauge cocks are exempt from this requirement. Valves shall be UL and/or FM approved for the service intended and bear the approval stamp.

4. Valves may be grooved type in grooved-joint piping systems.

5. Provide supervisory switch on all shutoff valves on all supply lines to sprinkler or standpipe systems, unless otherwise specified.

6. Provide valve operators per Section 15100

C. Gate Valves

1. Sizes 2" and smaller: Kennedy Fig. 66, bronze body, OS&Y, screwed ends, 175 psi WOG.

2. Sizes 2-1/2" and larger: Kennedy Fig. 68, iron body, bronze trim, rising stem, OS&Y, solid wedge, flanged ends, 175 psi WOG.

D. Check Valves:

1. Sizes 2" and smaller: Y-pattern clapper type Kennedy Fig. 440-SD, bronze body, swing disc, renewable composition soft disc, screwed ends, 200 psi WOG.

2. Sizes 2-1/2" and larger: Kennedy Fig. 126, iron body clapper type, bronze trim, swing disc, renewable bronze disc ring and seat, flanged ends and bolted bonnet, 175 psi WOG. Valve design shall allow inspection of the clapper without removing the valve from the pipe system.

E. Drain Valves

1. Conbraco Apollo 70, bronze body, stainless steel ball, Teflon seat and seals, 3/4-inch hose thread, 400 psi WOG.

2.06 BACKFLOW PREVENTER

A. Provide double check valve assemblies (DCA), Watts 007, 709 or 770 models or equal by Hersey, Clayton or Beeco, with gate service valves, size as indicated. Provide supervisory switches on valves.

2.07 PIPING SPECIALTIES

A. Acceptable Manufacturers: Grinnell, Globe, Reliable, Star, Viking. Substitutions under provisions of Section 15010.

B. Automatic ball drip valves: ball check type, closed when inlet is pressurized. Provide bronze body and threaded connections; designed for minimum 175 psig working pressure. Grinnell Model F789.

2.08. MECHANICAL IDENTIFICATION:

A. Materials as specified in Sections 15190 and 15099.

PART 3 - EXECUTION

3.01 PREPARATION AND GENERAL ITEMS

A. Prepare piping components for fitting per Section 15060

B. Install piping in accordance with NFPA 13 for sprinkler systems.

C. Do not penetrate building structural members without specific written permission from the Engineer.

D. Provide sleeves when penetrating footings, floors and walls.

3.02 INSTALLATION - UNDERGROUND PIPE

A. Underground pipe shall terminate in the building with a flanged ductile iron transition piece rodded to the underground pipe. Space between the pipe and floor slab or wall shall be filled with non-shrink grout.

B. Tie rods: coat rods, clamps, nuts and washers with bituminous coating.

C. Prior to connection of inside piping, new underground pipe shall be flushed at a rate of 1000 gpm until all foreign matter is blown out and the stream runs clear.

D. Prior to covering the joints of underground pipe, the pipe shall be hydrostatically tested for 2 hours at a pressure of 200 psig. Leakage allowance shall be within the limit specified in NFPA 24-Current Edition.

E. Changes in direction exceeding 22-1/2 deg. shall be anchored with tie rods and clamps. Fittings below building slabs shall be anchored with both tie rods and concrete thrust blocks.

F. Provide buried shut-off valves and valves in valve and meter vault as detailed. Provide post indicator valve as detailed.

3.03 INSTALLATION - MISCELLANEOUS PIPING

A. Assemble piping per Section 15060.

B. Screw joint steel piping up to and including 1-1/2 inch diameter. Screw or weld 2 inch diameter piping. Weld piping 2-1/2 inches diameter and larger, including branch

connections. Mechanical grooved joints may be used instead of threaded or welded joints.

C. Run pipe parallel to centerlines. Pipe shall be installed as high as possible to maintain maximum room. Provide auxiliary drains to drain all portions of the piping system.

D. Piping arrangements shall be made as compact as possible. Spool pieces and pipe nipples shall be as short as installation will allow.

E. Use galvanized piping and fittings for compressed air piping, ball drip discharges, drains subject to alternate wetting and drying, and water motor alarm piping.

F. Threads cut into galvanized pipe shall be painted with cold galvanizing compound.

G. Threads on fittings and bolts shall be fully engaged. Threads shall be made up using joint compound.

H. All drains and discharges from ball drips, and test connections shall be piped to spill outside the building. Provide a chrome escutcheon and a threaded 45 deg. galvanized elbow where drains terminate through building walls.

I. Torch cutting is not permitted as a means of modifying sprinkler system.

J. In steel piping, main sized saddle branch connections or direct connection of branch lines to mains is permitted if main is one pipe size larger than branch for up to 6 inch mains. Do not project branch pipes inside the main pipe.

K. Tie plug cut from pipe onto pipe with wire at any point where branch is saddled onto main.

L. Provide check and backflow valve assembly or detector check valve assembly at sprinkler system water source connection in valve and meter vault or in riser area as shown.

3.04 INSTALLATION - VALVES

A. Install valves per Sections 15060 and 15100.

B. Provide gate valves for shut-off or isolation service.

C. Where approved, butterfly valves may be used instead of gate valves.

D. Provide supervisory switch for each supply shutoff valve. Coordinate with Division 16.

E. Provide drain valves at main shut-off valves, low points of piping and apparatus.

3.05 ACCESSORIES:

A. Hangers and supports:

1. The installation and spacing of hangers shall conform to NFPA 13.

3.06 PAINTING AND MECHANICAL IDENTIFICATION

A. All fire piping shall be painted high-gloss red unless otherwise indicated. Paint all ferrous accessories and trim which are not pre-finished and in good condition. Non-ferrous items, valve stems, and sprinkler assemblies shall not be painted. Do not paint over any ID information except that which is cast into the metal.

B. Provide ID labeling of piping per Section 15190.

3.07 TESTS

A. Each portion of the piping shall be hydrostatically tested for 2 hours at 225 psig measured at the bottom of the system. All leaks shall be repaired until the system is tight for 2 hours. Submit a report describing tests and certifying the results to the Engineer.

PART 4 – SUBMITTALS

4.01 SUBMITTAL SCHEDULE

A. In accordance with the requirements of the General and Special Conditions and Section 15010, the following information is required to be submitted for this Section. The Contractor shall submit the specified copies of the required information to the designated party for approval within 30 days after Notice to Proceed.

Item Description	Shop Drawings	Product Data	Fire Flow Test	Installation Data	Hydraulic Calc's.	Piping Layout	Samples	O & M Manual	Certificates	State Submittal	Report	Other
Fire Protection Piping	X	X	X	X	X	X		X	X	X	X	
Valves		X		X				X				
Specialties		X		X				X				

END OF SECTION

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SECTION 15330 - FIRE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Sprinkler Contractor shall be solely responsible for all fire main piping from the point of separation of the domestic and fire water mains. Provide vault, Post Indicator Valve, Fire Department Connection and specialties as indicated. Provide accessories as indicated and as required by NFPA, State and local Codes.

1.02 REFERENCES

A. NFPA-13 - Installation of Sprinkler Systems.

B. NFPA-24 - Private Fire Service Mains.

C. Section 15310 - Fire Protection Piping.

D. Section 15190 - Mechanical Identification.

E. Kentucky Building Code.

1.04 QUALITY ASSURANCE

A. Installing firm shall be an experienced company, regularly engaged and specializing in the installation of sprinkler and fire protection systems with a minimum of three years of organizational (not personal) experience in design and installation of projects of similar size and scope. The company shall hold a current competency certificate issued by the Commonwealth of Kentucky. Work shall be under the direct supervision of a Licensed Sprinkler Installer.

B. Any pipe sizes shown on the plans shall be considered minimum allowable and shall be used in the design unless, for some reason, they are in conflict with some provision of the Code. Otherwise, pipe sizing shall meet the minimum requirements of all applicable codes. Risers, main entrances, test stations, vaults, Fire Dept. Connections and the like, if included, shall be installed reasonably close to locations shown on Plans, unless there is a code conflict or approval is obtained from the Engineer to relocate.

C. Unless noted otherwise in the Documents, all materials shall be new and free from defects.

D. Equipment, materials and accessories shall all bear the UL and/or FM label and shall be UL listed and FM approved for the service intended, where such listing exists.

E. Materials and equipment used for similar applications shall all be the products of one manufacturer, unless noted otherwise in the Documents.

F. All welders and welding procedures shall be qualified according to the American Welding Society AWS D10.9-Current Edition, Level AR-3.

1.05 REGULATORY REQUIREMENTS

A. Design, materials and installation shall conform to all provisions of NFPA 13, and where applicable, NFPA 24.

B. Conform to applicable sections of the Kentucky Building Code for sprinkler systems.

C. Submit plans, approved and stamped by the Engineer, to the State Fire Marshal's office, or other authority having jurisdiction, for approval as indicated below. Work shall not proceed until such approval is obtained and a copy transmitted to the Engineer.

D. Work shall be under the direct supervision of a Licensed Sprinkler Installer.

1.06 SUBMITTALS

A. Submit shop drawings and product data as one package per Section 15010 and include the following: Exterior piping, valves, FDC, PIV, vaults, check and backflow valve assemblies, tamper switches, required signage for all items, Mechanical ID (Section 15190) and all other accessories.

B. Submit plans, approved and stamped by the Engineer, to the State Fire Marshal's office, or other authority having jurisdiction, for approval and obtain permit. Submit one copy of Government-stamped approved drawings and calculations for record to the Engineer. Work shall not proceed until such approval is obtained and a copy transmitted to the Engineer. Plans shall be done by a Licensed Sprinkler Layout Technician or a Licensed Professional Engineer.

1.07 PROJECT RECORD DOCUMENTS

A. Submit complete "as-built" documents under provisions of Section 15010.

B. After installation, inspection and tests are complete, submit to Engineer and to the authority having jurisdiction, the Contractor's Material and Test Certificates for above and/or underground system, as required by NFPA 13, before request for final payment. All data shall be typed and documents shall bear the required signatures.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 15010.

B. Include written maintenance data on all components of system, with servicing requirements and parts lists.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials and equipment in shipping containers with labeling in place under provisions of Section 15010.

B. Provide temporary inlet and outlet caps for all piping connections. Maintain caps in place until installation.

PART - 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers are listed for each type of component. Substitutions shall be per Section 15010.

2.02 PIPING SYSTEM

A. All piping work shall be in accordance with Specifications Section 15310 - Fire Protection Piping, NFPA-13 and included references, unless otherwise modified in this Section.

B. Provide general service valves as indicated in Section 15310 - Fire Protection Piping and special purpose valves as specified herein.

2.03 BACKFLOW PREVENTER

A. Provide double check valve assemblies (DCA), Watts 007, 709 or 770 models or equal by Hersey, Clayton or Beeco, with gate service valves, size as indicated. Coordinate with Division 16 to provide supervisory switches on all valves.

2.04 POST INDICATOR VALVES (PIV)

A. Acceptable Manufacturers: Grinnell, Globe, Reliable, Star, Viking, Waterous or valve manufacturer. Substitutions under provisions of Section 15010.

B. Free-Standing Type: Provide indicator post trim for exterior main shutoff valve on fire water supply line, with locking operating handle and provisions for tamper switch, Grinnell F752 or equal.

C. Wall-Mounted Type: Provide indicator post trim for interior main shutoff valve on fire water supply line, with wheel handle, eye for chain locking and provisions for tamper switch, Grinnell F753 or equal.

2.05 FIRE DEPARTMENT INLET CONNECTION (FDC)

A. Catalog numbers of Potter-Roemer are used as a standard. Optional manufacturers: Akron Brass, W.D. Allen, Automatic Sprinkler, Croker Standard, Elkhart Brass, Grunau, Hodgman, J.L. Industries, Moon, Grinnell, Reliable, Seco, Star, Viking or Zurn.

B. Free standing siamese type: Cast brass 2-1/2" x 2-1/2" x 4" riser, 90 degree back bottom connection, with double drop clappers, N.P.T. inlet, female pin lug swivel hose thread to

match fire department hardware, rough brass finish with raised lettering "AUTO.SPKR.", swivel brass plugs and brass or stainless chains, min. 500 gpm, Potter-Roemer 5731.

C. Wall mounted siamese type: Cast brass 2-1/2" x 2-1/2" x 4", back connection, with double drop clappers, N.P.T. inlet, female pin lug swivel hose thread to match fire department hardware, rough brass finish, cast brass or red enamelled aluminum round wall escutcheon plate for penetration with raised letters, "AUTO.SPKR.", swivel brass plugs and brass or stainless chains, min. 500 gpm, Potter-Roemer 5751.

D. Provide single connection 4 1/2" x 4"riser or other variation where preferred by fire department with jurisdiction.

2.06 SUPERVISORY SWITCHES

A. Catalog numbers of Grinnell are used as a standard. Optional manufacturers: Automatic Sprinkler, Federal Signal Corporation, Gem, Grunau, Micro-Switch, Notifier, Potter-Roemer, Reliable, Simplex, Star, or Viking.

B. Valve tamper switches: The switch shall mount without the use of blocks and shall not interfere with valve operation. A signal shall be initiated before the valve stem moves more than 1/5 of its total travel or if the housing cover is removed. Grinnell Model F647 NEMA 2 housing, tamperproof.

C. Dry pipe air pressure supervisory switches: pressure operated type with field adjustable set points. Switch shall supervise both high and low air pressure conditions in the piping system. Provide for each dry pipe and preaction system.

D. Coordinate with building fire alarm system.

2.07 MECHANICAL IDENTIFICATION

A. Materials as specified in Section 15190.

B. All exposed fire piping shall be painted high-gloss red unless otherwise indicated. Paint all ferrous accessories and trim which are not pre-finished and in good condition. Non-ferrous items, valve stems, and sprinkler assemblies shall not be painted. Do not paint over any ID information except that which is cast into the metal.

C. Provide ID labeling of piping per Section 15190.

2.08 SIGNAGE

A. Meet all minimum requirements of NFPA 13 for signage and identification. All signs shall be permanently marked waterproof metal or plastic secured with corrosion-resistant chain, wire or fasteners.

B. Provide signs for Fire Dept. Connections. Provide signs for new Post Indicator Valves wherever two or more will exist near the project site.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate work of this Section with all other trades. See Section 15010.

3.02 GENERAL

A. All shutoff valves in the fire water line shall be equipped with supervisory switches.

3.03 INSTALLATION - WATER SERVICE

A. Connect sprinkler system to water source ahead of domestic water connection or at vault, as indicated on Drawings. Provide buried shut-off valves and all valves in valve and meter (pumper) vault as indicated. Provide post indicator on one of the valves. Combination sprinkler and standpipe systems shall use common supply. Line shall be isolated from potable water by a Double Check valve Assembly in vault or in riser area for backflow prevention. Provide detector feature as required by water supplier. Provide additional valve assembly with supervisory switch in riser area where shown.

B. Provide exterior fire dept. inlet connection (FDC) per details on the Drawings and of the size indicated, minimum 4". Coordinate with local fire dept. Provide permanently attached signage identifying fire dept. connection as an "AUTO.SPRINKLER" inlet. Locate Fire Department Connection with sufficient clearance from obstructions to allow full swing of fire department wrench handle. Set FDC level with the centerline 36" above finished grade. Provide line-sized swing check valve and automatic ball drip assembly per details.

C. Post Indicator Valves (PIV) and the ferrous parts or risers of Siamese or Fire Dept. Connections (FDC) shall be prepared, primed and painted per 15099 and Section 15010. Color shall be gloss red or such other color as designated by the Engineer.

3.04 CLEANING

A. Underground piping shall be flushed in accordance with NFPA 24.

3.05 SYSTEM TESTS

A. Underground piping shall be tested in accordance with NFPA 24.

B. Testing shall be witnessed by designated inspector, approved by the Engineer, and Fire Marshal. Contractor shall arrange attendance at the test at least one week in advance.

D. At the completion of all work, conduct a comprehensive inspection of all new sprinkler systems to ensure that all new systems are operational. Submit a letter to the Engineer certifying that, as of the date of the inspection, all control valves were open, and all accessories were installed.

PART 4 – SUBMITTALS

4.01 SUBMITTAL SCHEDULE

A. In accordance with the requirements of the General and Special Conditions and Section 15010, the following information is required to be submitted for this Section. The Contractor shall submit the specified copies of the required information to the designated party for approval within 30 days after Notice to Proceed.

Item Description	Shop Drawings	Product Data	Fire Flow Test	Installation Data	Hydraulic Calc's.	Piping Layout	Samples	O & M Manual	Certificates	State Submittal	Report	Other
Specialties		X		X				X				
Fire Dept. Conn.		X		X		X		X				
Post Indicator Vlv.		X		X		X		X				
Backflow Devices		X		X		X		X				

END OF SECTION

G5330/07064
3162/wb/04057

KENTUCKY TRANSPORTATION CABINET
COMMUNICATING ALL PROMISES (CAP)
ACTIVE

Item No. 3 - 102.1 **Project Mgr.** kytc\Andrew.Stewart

County WARREN **Route** KY-884

CAP #	Date of Promise	Promise made to:	Location of Promise
1	13-SEP-12	Andrew Stewart	

CAP Description

THERE ARE NO CAPS ON THIS PROJECT.

PART II

SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2012* and *Standard Drawings, Edition of 2012 with the 2012 Revision.*

Supplemental Specifications to the Standard Specifications for Road and Bridge Construction, 2012 Edition

(Effective with the August 17, 2012 Letting)

Subsection:	402.03.02 Contractor Quality Control and Department Acceptance.
Part:	D) Testing Responsibilites.
Number:	4) Density.
Revision:	Replace the second sentence of the Option A paragraph with the following: Perform coring by the end of the following work day.
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 decks prepared by hydrodemolition.
Subsection:	609.03 Construction.
Revision:	Replace Subsection 609.03.01 with the following: 609.03.01 A) Swinging the Spans. Before placing concrete slabs on steel spans or precast concrete release the temporary erection supports under the bridge and swing the span free on its supports. 609.03.01 B) Lift Loops. Cut all lift loops flush with the top of the precast beam once the beam is placed in the final location and prior to placing steel reinforcement. At locations where lift loops are cut, paint the top of the beam with galvanized or epoxy paint.

1I

SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

2.0 MATERIALS.

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

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

2.2 Sign and Controls. All signs must:

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

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

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

2.3 Power.

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

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

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

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

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

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

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

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

Code	Pay Item	Pay Unit
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

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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

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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[1]	Type 1	Type 2	Type 3	Type 4	Test Method
Minimum tensile Strength lbs/ft	125	150	175	3000 by 1500	ASTM D6818[2]
UV stability (minimum % tensile retention)	80	80	80	90	ASTM D4355[3] (1000-hr exposure)
Minimum thickness (inches)	0.25	0.25	0.25	0.40	ASTM D6525
Slopes applications	2H:1V or flatter	1.5H:1V or flatter	1H:1V or flatter	1 H: 1V or greater	
Shear stress lbs/ft^2 Channel applications	6.0[4]	8.0[4]	10.0[4]	12.0[4]	ASTM D6459 ASTM D6460-07

[1] For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting alone.
[2]Minimum Average Roll Values for tensile strength of sample material machine direction.
[3]Tensile Strength percentage retained after stated 1000 hr duration of exposure under ASTM D4355 testing. Based on nondegradable components exclusively.
[4]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.

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.

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

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

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

I. APPLICATION

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

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

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

II. NONDISCRIMINATION OF EMPLOYEES

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

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

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (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 work-week unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such work-week. A laborer, workman or mechanic and an employer may enter into a written agreement or a collective bargaining agreement to work more than eight (8) hours a calendar day but not more than ten (10) hours a calendar day for the straight time hourly rate. This agreement shall be in writing and shall be executed prior to the employee working in excess of eight (8) hours, but not more than ten (10) hours, in any one (1) calendar day.

12. Payments to the contractor may be suspended or withheld due to failure of the contractor to pay any laborer or mechanic employed or working on the site of the work, all or part of the wages required under the terms of the contract. The Department may suspend or withhold payments only after the contractor has been given written notice of the alleged violation and the contractor has failed to comply with the wage determination of the Department of Highways.

13. Contractors and subcontractors shall comply with the sections of Kentucky Revised Statutes, Chapter 337 relating to contracts for Public Works.

Revised 2-16-95

EXECUTIVE BRANCH CODE OF ETHICS

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

KRS 11A.040 (6) provides:

No present or former public servant shall, within six (6) months of following termination of his office or employment, accept employment, compensation or other economic benefit from any person or business that contracts or does business with the state in matters in which he was directly involved during his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved in state government. This subsection shall not prohibit the performance of ministerial functions, including, but not limited to, filing tax returns, filing applications for permits or licenses, or filing incorporation papers.

KRS 11A.040 (8) states:

A former public servant shall not represent a person in a matter before a state agency in which the former public servant was directly involved, for a period of one (1) year after the latter of:

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

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

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

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

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, Room 136, Capitol Building, 700 Capitol Avenue, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Kentucky Equal Employment Opportunity Act of 1978

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

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

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

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

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

General Decision Number: KY120127 09/28/2012 KY127

Superseded General Decision Number: KY20100214

State: Kentucky

Construction Type: Highway

Counties: Allen, Ballard, Butler, Caldwell, Calloway, Carlisle, Christian, Crittenden, Daviess, Edmonson, Fulton, Graves, Hancock, Henderson, Hickman, Hopkins, Livingston, Logan, Lyon, Marshall, McCracken, McLean, Muhlenberg, Ohio, Simpson, Todd, Trigg, Union, Warren and Webster 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).

Modification Number	Publication Date
0	01/06/2012
1	01/13/2012
2	02/10/2012
3	05/18/2012
4	05/25/2012
5	06/01/2012
6	06/15/2012
7	07/06/2012
8	07/13/2012
9	07/20/2012
10	08/03/2012
11	08/10/2012
12	08/24/2012
13	08/31/2012
14	09/28/2012

BRIN0004-002 06/01/2011

BALLARD, BUTLER, CALDWELL, CARLISLE, CRITTENDEN, DAVIESS, EDMONSON, FULTON, GRAVES, HANCOCK, HENDERSON, HICKMAN, HOPKINS, LIVINGSTON, LYON, MARSHALL, MCCRACKEN, MCLEAN, MUHLENBERG, OHIO, UNION, and WEBSTER COUNTIES

	Rates	Fringes
BRICKLAYER		
Ballard, Caldwell, Carlisle, Crittenden, Fulton, Graves, Hickman, Livingston, Lyon, Marshall, and McCracken Counties	$ 24.11	10.30
Butler, Edmonson, Hopkins, Muhlenberg, and Ohio Counties	$ 24.61	10.22

Daviess, Hancock,
Henderson, McLean, Union,
and Webster Counties.....$ 28.47 12.78

BRTN0004-005 05/01/2009

ALLEN, CALLOWAY, CHRISTIAN, LOGAN, SIMPSON, TODD, TRIGG, and WARREN COUNTIES

	Rates	Fringes
BRICKLAYER	$ 24.52	1.83

CARP0357-002 07/01/2012

	Rates	Fringes
CARPENTER	$ 26.40	13.91
Diver	$ 39.98	13.91
PILEDRIVERMAN	$ 26.65	13.91

ELEC0369-006 05/30/2012

BUTLER, EDMONSON, LOGAN, TODD & WARREN COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 29.32	13.78

ELEC0429-001 02/01/2010

ALLEN & SIMPSON COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 21.85	10.35

ELEC0816-002 06/01/2011

BALLARD, CALDWELL, CALLOWAY, CARLISLE, CHRISTIAN, CRITTENDEN, FULTON (Except a 5 mile radius of City Hall in Fulton), GRAVES, HICKMAN, LIVINGSTON, LYON, MARSHALL, MCCRACKEN & TRIGG COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 29.47	25.5%+5.35

Cable spicers receive $.25 per hour additional.

ELEC1701-003 06/01/2012

DAVIESS, HANCOCK, HENDERSON, HOPKINS, MCLEAN, MUHLENBERG, OHIO, UNION & WEBSTER COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 29.52	13.66

Cable spicers receive $.25 per hour additional.

ELEC1925-002 06/01/2012

FULTON COUNTY (Up to a 5 mile radius of City Hall in Fulton):

	Rates	Fringes
CABLE SPLICER	$ 25.00	10.27
ELECTRICIAN	$ 25.00	10.43

ENGI0181-017 07/01/2012

	Rates	Fringes
Operating Engineer:		
GROUP 1	$ 27.35	13.40
GROUP 2	$ 24.87	13.40
GROUP 3	$ 25.26	13.40
GROUP 4	$ 24.60	13.40

OPERATING ENGINEER CLASSIFICATIONS

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 equals or exceeds 150 ft. - $1.00 above 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.

IRON0070-005 06/01/2012

BUTLER COUNTY (Eastern eighth, including the Townships of Decker, Lee & Tilford);
EDMONSON COUNTY (Northern three-fourths, including the Townships of Asphalt, Bee Spring, Brownsville, Grassland, Huff, Kyrock, Lindseyville, Mammoth Cave, Ollie, Prosperity, Rhoda, Sunfish & Sweden)

	Rates	Fringes
Ironworkers: Structural; Ornamental; Reinforcing; Precast Concrete Erectors	$ 26.34	18.58

IRON0103-004 04/01/2011

DAVIESS, HANCOCK, HENDERSON, HOPKINS, MCLEAN, OHIO, UNION & WEBSTER COUNTIES
BUTLER COUNTY (Townships of Aberdeen, Bancock, Casey, Dexterville, Dunbar, Elfie, Gilstrap, Huntsville, Logansport, Monford, Morgantown, Provo, Rochester, South Hill & Welchs Creek);
CALDWELL COUNTY (Northeastern third, including the Township of Creswell);
CHRISTIAN COUNTY (Northern third, including the Townships of Apex, Crofton, Kelly, Mannington & Wynns);
CRITTENDEN COUNTY (Northeastern half, including the Townships of Grove, Mattoon, Repton, Shady Grove & Tribune);
MUHLENBERG COUNTY (Townships of Bavier, Beech Creek Junction, Benton, Brennen, Browder, Central City, Cleaton, Depoy, Drakesboro, Eunis, Graham, Hillside, Luzerne, Lynn City, Martwick, McNary, Millport, Moorman, Nelson, Paradise, Powderly, South Carrollton, Tarina & Weir)

	Rates	Fringes
Ironworkers:	$ 28.25	14.475

IRON0492-003 05/01/2012

ALLEN, LOGAN, SIMPSON, TODD & WARREN COUNTIES
BUTLER COUNTY (Southern third, including the Townships of Boston, Berrys Lick, Dimple, Jetson, Quality, Sharer, Sugar Grove & Woodbury);
CHRISTIAN COUNTY (Eastern two-thirds, including the Townships of Bennettstown, Casky, Herndon, Hopkinsville, Howell, Masonville, Pembroke & Thompsonville);
EDMONSON COUNTY (Southern fourth, including the Townships of Chalybeate & Rocky Hill);
MUHLENBERG COUNTY (Southern eighth, including the Townships of Dunnior, Penrod & Rosewood)

	Rates	Fringes
Ironworkers:	$ 23.00	10.70

IRON0782-006 05/01/2012

BALLARD, CALLOWAY, CARLISLE, FULTON, GRAVES, HICKMAN, LIVINGSTON, LYON, MARSHALL, MCCRACKEN & TRIGG COUNTIES
CALDWELL COUNTY (Southwestern two-thirds, including the Townships of Cedar Bluff, Cider, Claxton, Cobb, Crowtown, Dulaney, Farmersville, Fredonia, McGowan, Otter Pond & Princeton);
CHRISTIAN COUNTY (Western third, Excluding the Townships of Apex, Crofton, Kelly, Mannington, Wynns, Bennettstown, Casky, Herndon, Hopkinsville, Howell, Masonville, Pembroke & Thompsonville);
CRITTENDEN COUNTY (Southwestern half, including the Townships of Crayne, Dycusburg, Frances, Marion, Mexico, Midway, Sheridan & Told)

	Rates	Fringes
Ironworkers:		
Projects with a total contract cost of $20,000,000.00 or above	$ 26.00	18.91
All Other Work	$ 24.66	17.65

LABO0189-005 07/01/2012

BALLARD, CALLOWAY, CARLISLE, FULTON, GRAVES, HICKMAN, LIVINGSTON, LYON, MARSHALL & MCCRACKEN COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 20.75	11.81
GROUP 2	$ 21.00	11.81

GROUP 3	$ 21.05	11.81
GROUP 4	$ 21.65	11.81

LABORER 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; Blaster; 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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LABO0189-006 07/01/2012

ALLEN, BUTLER, CALDWELL, CHRISTIAN, DAVIESS, EDMONSON, HANCOCK, HOPKINS, LOGAN, MCLEAN, MUHLENBERG, OHIO, SIMPSON, TODD, TRIGG & WARREN COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 21.96	10.60
GROUP 2	$ 22.21	10.60
GROUP 3	$ 22.26	10.60
GROUP 4	$ 22.86	10.60

LABORER 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; Blaster; 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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LABO0561-001 07/01/2012

CRITTENDEN, HENDERSON, UNION & WEBSTER COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 20.86	11.70
GROUP 2	$ 21.11	11.70
GROUP 3	$ 21.16	11.70
GROUP 4	$ 21.76	11.70

LABORER 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; Blaster; 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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PAIN0032-002 05/01/2012

BALLARD COUNTY

	Rates	Fringes
Painters:		
Bridges	$ 30.56	14.20
All Other Work	$ 28.26	14.20

Spray, Blast, Steam, High & Hazardous (Including Lead Abatement) and All Epoxy - $1.00 Premium

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PAIN0118-003 05/01/2010

EDMONSON COUNTY:

	Rates	Fringes
Painters:		
Brush & Roller	$ 18.50	10.30
Spray, Sandblast, Power Tools, Waterblast & Steam Cleaning	$ 19.50	10.30

PAIN0156-006 04/01/2010

DAVIESS, HANCOCK, HENDERSON, MCLEAN, OHIO, UNION & WEBSTER COUNTIES

	Rates	Fringes
Painters:		
BRIDGES		
GROUP 1	$ 25.60	10.05
GROUP 2	$ 25.85	10.05
GROUP 3	$ 26.60	10.05
GROUP 4	$ 27.60	10.05
ALL OTHER WORK:		
GROUP 1	$ 25.60	11.30
GROUP 2	$ 25.85	11.30
GROUP 3	$ 26.60	11.30
GROUP 4	$ 27.60	11.30

PAINTER CLASSIFICATIONS

GROUP 1 - Brush & Roller

GROUP 2 - Plasterers

GROUP 3 - Spray; Sandblast; Power Tools; Waterblast; Steamcleaning; Brush & Roller of Mastics, Creosotes, Kwinch Koate & Coal Tar Epoxy

GROUP 4 - Spray of Mastics, Creosotes, Kwinch Koate & Coal Tar Epoxy

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PAIN0456-003 07/01/2011

ALLEN, BUTLER, LOGAN, MUHLENBERG, SIMPSON, TODD & WARREN COUNTIES:

	Rates	Fringes
Painters:		
BRIDGES		
Brush & Roller	$ 22.55	9.65
Spray; Sandblast; Power Tools; Waterblast & Steam Cleaning	$ 23.55	9.65
ALL OTHER WORK		
Brush & Roller	$ 17.55	9.65
Spray; Sandblast; Power Tools; Waterblast & Steam Cleaning	$ 18.55	9.65

ALL OTHER WORK - HIGH TIME PAY
Over 35 feet (up to 100 feet) - $1.00 above base wage
100 feet and over - $2.00 above base wage

DURING SPRAY PAINTING AND SANDBLASTING OPERATIONS, POT TENDERS SHALL RECEIVE THE SAME WAGE RATES AS THE SPRAY PAINTER OR NOZZLE OPERATOR

PAIN0500-002 07/01/2012

CALDWELL, CALLOWAY, CARLISLE, CHRISTIAN, CRITTENDEN, FULTON, GRAVES, HICKMAN, HOPKINS, LIVINGSTON, LYON, MARSHALL, MCCRACKEN

& TRIGG COUNTIES:

	Rates	Fringes
Painters:		
Bridges	$ 25.25	11.90
All Other Work	$ 19.00	11.90

Waterblasting units with 3500 PSI and above - $.50 premium
Spraypainting and all abrasive blasting - $1.00 premium
Work 40 ft. and above ground level - $1.00 premium

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* PLUM0184-002 07/01/2012

BALLARD, CALDWELL, CALLOWAY, CARLISLE, CHRISTIAN, CRITTENDEN, FULTON, GRAVES, HICKMAN, LIVINGSTON, LYON, MARSHALL, MCCRACKEN and TRIGG COUNTIES

	Rates	Fringes
Plumber; Steamfitter	$ 32.31	14.43

PLUM0502-004 08/01/2011

ALLEN, BUTLER, EDMONSON, SIMPSON & WARREN

	Rates	Fringes
Plumber; Steamfitter	$ 31.00	16.13

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* PLUM0633-002 07/01/2012

DAVIESS, HANCOCK, HENDERSON, HOPKINS, LOGAN, MCLEAN, MUHLENBERG, OHIO, TODD, UNION & WEBSTER COUNTIES:

	Rates	Fringes
PLUMBER/PIPEFITTER	$ 29.42	13.50

TEAM0089-003 04/01/2012

Zone 1: ALLEN, BUTLER, EDMONSON, LOGAN, SIMPSON, & WARREN COUNTIES
Zone 2: BALLARD, CALLOWAY, CALDWELL, CARLISLE, CHRISTIAN, CRITTENDEN, FULTON, GRAVES, HICKMAN, LIVINGSTON, LYON, MARSHALL, MCCRACKEN, TODD, & TRIGG COUNTIES
Zone 3: DAVIESS, HANCOCK, HENDERSON, HOPKINS, MCLEAN, MUHLENBERG, OHIO, & WEBSTER COUNTIES

	Rates	Fringes
Truck drivers:		
Zone 1:		
Group 1	$ 19.38	16.15
Group 2	$ 19.56	16.15
Group 3	$ 19.64	16.15

Group 4	$ 19.66	16.15
Zone 2:		
Group 1	$ 19.38	16.15
Group 2	$ 19.56	16.15
Group 3	$ 19.56	16.15
Group 4	$ 19.66	16.15
Group 5	$ 19.64	16.15
Zone 3:		
Group 1	$ 19.38	16.15
Group 2	$ 19.56	16.15
Group 3	$ 19.56	16.15
Group 4	$ 19.66	16.15

TRUCK DRIVER CLASSIFICATIONS FOR ZONE 1:

GROUP 1 - Greaser; Tire Changer

GROUP 2 - Truck Mechanic; Single Axle Dump; Flat Bed; All Terrain Vehicles when used to haul materials; Semi Trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Driver of Distributors

GROUP 3 - Mixer All Types

GROUP 4 - Winch and A-Frame when used in transporting materials; Ross Carrier; Fork Lift when used to transport building materials; Driver on Pavement Breaker; Euclid and Other Heavy Earth Moving Equipment; Low Boy; Articulator Cat; Five Axle Vehicle

TRUCK DRIVER CLASSIFICATIONS FOR ZONE 2:

GROUP 1 - Greaser; Tire Changer

GROUP 2 - Truck Mechanic

GROUP 3 - Single Axle Dump; Flat Bed; all Terrain Vehicles when used to haul materials; Semi Trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Driver of Distributors

GROUP 4 - Euclid and Other Heavy Earth Moving Equipment; Low Boy; Articulator Cat; Five Axle Vehicle; Winch and A-Frame when used in transporting materials; Ross Carrier

GROUP 5 - Mixer All Types

TRUCK DRIVER CLASSIFICATIONS FOR ZONE 3:

GROUP 1 - Greaser, Tire Changer

GROUP 2 - Truck Mechanic

GROUP 3 - Single Axle Dump; Flat Bed; all Terrain Vehicle when used to haul materials; Semi Trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Driver of Distributors; Mixer All Types

GROUP 4 - Euclid and Other Heavy Earth moving Equipment; Lowboy; Articulator Cat; 5 Axle Vehicle; Winch and A-Frame when used in transporting materials; Ross Carrier; Fork Lift when used to transport building materials; Driver on 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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may

include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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-III-I-HWY dated September 5, 2012.

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.

Ryan Griffith, Director
Division of Construction Procurement
Frankfort, Kentucky 40622

PART IV

INSURANCE

INSURANCE

The Contractor shall procure and maintain the following insurance in addition to the insurance required by law:

1) Commercial General Liability-Occurrence form – not less than $2,000,000 General aggregate, $2,000,000 Products & Completed Aggregate, $1,000,000 Personal & Advertising, $1,000,000 each occurrence.

2) Automobile Liability- $1,000,000 per accident

3) Employers Liability:

   a) $100,000 Each Accident Bodily Injury
   b) $500,000 Policy limit Bodily Injury by Disease
   c) $100,000 Each Employee Bodily Injury by Disease

4) The insurance required above must be evidenced by a Certificate of Insurance and this Certificate of Insurance must contain one of the following statements:
   a) "policy contains no deductible clauses."
   b) "policy contains _____ (amount) deductible property damage clause but company will pay claim and collect the deductible from the insured."

5) KENTUCKY WORKMEN'S COMPENSATION INSURANCE. The contractor shall furnish evidence of coverage of all his employees or give evidence of self-insurance by submitting a copy of a certificate issued by the Workmen's Compensation Board.

The cost of insurance is incidental to all contract items. All subcontractors must meet the same minimum insurance requirements.

PART V

BID ITEMS

PROPOSAL BID ITEMS

121348

Report Date 10/26/12

Section: 1 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	3,713.00	TON		$	
0020	00078		CRUSHED AGGREGATE SIZE NO 2	8,013.00	TON		$	
0030	00100		ASPHALT SEAL AGGREGATE	2.22	TON		$	
0040	00103		ASPHALT SEAL COAT	.27	TON		$	
0050	00190		LEVELING & WEDGING PG64-22	444.00	TON		$	
0060	00214		CL3 ASPH BASE 1.00D PG64-22	6,767.00	TON		$	
0070	00324		CL3 ASPH SURF 0.50B PG64-22	1,554.00	TON		$	

Section: 2 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
0080	01000		PERFORATED PIPE-4 IN	380.00	LF		$	
0090	01005		PERFORATED PIPE EDGE DRAIN-4 IN	3,173.00	LF		$	
0100	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM	1.00	LS		$	
0110	01740		CORED HOLE DRAINAGE BOX CON-4 IN	25.00	EACH		$	
0120	01810		STANDARD CURB AND GUTTER	1,845.00	LF		$	
0130	01875		STANDARD HEADER CURB	593.00	LF		$	
0140	01880		BARRIER HEADER CURB	306.00	LF		$	
0150	01895		VALLEY GUTTER	67.00	LF		$	
0160	01904		REMOVE CURB	58.00	LF		$	
0170	01923		STANDARD BARRIER MEDIAN TYPE 5	257.00	SQYD		$	
0180	02014		BARRICADE-TYPE III	6.00	EACH		$	
0190	02091		REMOVE PAVEMENT	162.00	SQYD		$	
0200	02101		CEM CONC ENT PAVEMENT-8 IN	898.00	SQYD		$	
0210	02200		ROADWAY EXCAVATION	6,086.00	CUYD		$	
0220	02203		STRUCTURE EXCAV-UNCLASSIFIED	40.00	CUYD		$	
0230	02242		WATER	50.00	MGAL		$	
0240	02429		RIGHT-OF-WAY MONUMENT TYPE 1	25.00	EACH		$	
0250	02432		WITNESS POST	3.00	EACH		$	
0260	02469		CLEAN SINKHOLE	1.00	EACH		$	
0270	02545		CLEARING AND GRUBBING(5 ACRES)	1.00	LS		$	
0280	02555		CONCRETE-CLASS B	70.00	CUYD		$	
0290	02562		SIGNS	514.50	SQFT		$	
0300	02585		EDGE KEY	237.00	LF		$	
0310	02599		FABRIC-GEOTEXTILE TYPE IV	15,000.00	SQYD	$2.00	$	$30,000.00
0320	02600		FABRIC GEOTEXTILE TY IV FOR PIPE	5,847.00	SQYD		$	
0330	02611		HANDRAIL-TYPE A-1	202.00	LF		$	
0340	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		$	
0350	02671		PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH		$	
0360	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		$	
0370	02677		ASPHALT PAVE MILLING & TEXTURING	97.00	TON		$	
0380	02720		SIDEWALK-4 IN CONCRETE	1,060.00	SQYD		$	
0390	02726		STAKING	1.00	LS		$	
0400	02775		ARROW PANEL	2.00	EACH		$	
0410	05950		EROSION CONTROL BLANKET	598.00	SQYD		$	
0420	05966		TOPDRESSING FERTILIZER	.30	TON		$	
0430	05985		SEEDING AND PROTECTION	4,745.00	SQYD		$	

121348

PROPOSAL BID ITEMS

Report Date 10/26/12

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
0440	05990		SODDING	8,275.00	SQYD		$	
0450	06510		PAVE STRIPING-TEMP PAINT-4 IN	22,000.00	LF		$	
0460	06514		PAVE STRIPING-PERM PAINT-4 IN	9,918.00	LF		$	
0470	06566		PAVE MARKING-THERMO X-WALK-12 IN	253.00	LF		$	
0480	06567		PAVE MARKING-THERMO STOP BAR-12IN	17.00	LF		$	
0490	06568		PAVE MARKING-THERMO STOP BAR-24IN	55.00	LF		$	
0500	06569		PAVE MARKING-THERMO CROSS-HATCH	8,126.00	SQFT		$	
0510	06572		PAVE MARKING-DOTTED LANE EXTEN	193.00	LF		$	
0520	06574		PAVE MARKING-THERMO CURV ARROW	16.00	EACH		$	
0530	06575		PAVE MARKING-THERMO COMB ARROW	4.00	EACH		$	
0540	06589		PAVEMENT MARKER TYPE V-MW	25.00	EACH		$	
0550	06591		PAVEMENT MARKER TYPE V-BY	76.00	EACH		$	
0560	10020NS		FUEL ADJUSTMENT	15,158.00	DOLL	$1.00	$	$15,158.00
0570	10030NS		ASPHALT ADJUSTMENT	20,177.00	DOLL	$1.00	$	$20,177.00
0580	20430ED		SAW CUT	738.00	LF		$	
0590	23131ER701		PIPELINE VIDEO INSPECTION	1,290.00	LF		$	
0600	23139EN		STRIPING REMOVAL	500.00	LF		$	
0610	23143ED		KPDES PERMIT AND TEMP EROSION CONTROL	1.00	LS		$	
0620	23158ES505		DETECTABLE WARNINGS	102.00	SQFT		$	
0630	23791EC		PAVE STRIPING-CHEVRON MARKINGS	2,061.00	SQFT		$	
0640	24540		R/W MONUMENT TYPE 3	2.00	EACH		$	

Section: 3 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
0650	00520		STORM SEWER PIPE-12 IN	8.00	LF		$	
0660	00521		STORM SEWER PIPE-15 IN	263.00	LF		$	
0670	00522		STORM SEWER PIPE-18 IN	709.00	LF		$	
0680	00524		STORM SEWER PIPE-24 IN	722.00	LF		$	
0690	00526		STORM SEWER PIPE-30 IN	200.00	LF		$	
0700	00528		STORM SEWER PIPE-36 IN	677.00	LF		$	
0710	00980		SLOTTED DRAIN PIPE-12 IN	67.00	LF		$	
0720	01456		CURB BOX INLET TYPE A	12.00	EACH		$	
0730	01496		DROP BOX INLET TYPE 3	4.00	EACH		$	
0740	01499		DROP BOX INLET TYPE 4	4.00	EACH		$	
0750	01559		DROP BOX INLET TYPE 13G	4.00	EACH		$	
0760	01565		DROP BOX INLET TYPE 13GT	1.00	EACH		$	
0770	01568		DROP BOX INLET TYPE 13S	5.00	EACH		$	
0780	01580		DROP BOX INLET TYPE 15	1.00	EACH		$	
0790	01587		DROP BOX INLET TYPE 16S	1.00	EACH		$	
0800	01643		JUNCTION BOX-24 IN	1.00	EACH		$	
0810	01645		JUNCTION BOX-36 IN	1.00	EACH		$	
0820	08100		CONCRETE-CLASS A	3.12	CUYD		$	
0830	08150		STEEL REINFORCEMENT	182.00	LB		$	
0840	23275EN11F		TURF REINFORCEMENT MAT 2	33.00	SQYD		$	

Section: 4 - UTILITY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
0850	01052		SEWER PIPE-8 IN(PVC GRAVITY)	1,079.00	LF		$	
0860	01054		SEWER PIPE-12 IN(PVC GRAVITY)	1,506.00	LF		$	
0870	01055		SEWER PIPE-15 IN(PVC GRAVITY)	80.00	LF		$	
0880	01093		DUCTILE IRON PIPE-6 IN	20.00	LF		$	
0890	01095		DUCTILE IRON PIPE-8 IN	115.00	LF		$	
0900	01095		DUCTILE IRON PIPE-8 IN(IN 16 INCH STEEL COVER PIPE-BORE & JACK	190.00	LF		$	
0910	01097		DUCTILE IRON PIPE-10 IN	2,245.00	LF		$	
0920	01097		DUCTILE IRON PIPE-10 IN(IN 18 INCH STEEL COVER PIPE-BORE & JACK	40.00	LF		$	
0930	01314		PLUG PIPE(ALL SIZES)	11.00	EACH		$	
0940	01787		REMOVE MANHOLE(IN ROADWAY)	7.00	EACH		$	
0950	01787		REMOVE MANHOLE(NOT IN ROADWAY)	6.00	EACH		$	
0960	01799		SANITARY SEWER MANHOLE(4 FOOT DIAMETER)	13.00	EACH		$	
0970	02220		FLOWABLE FILL(BACKFILL-WATER)	4.00	CUYD		$	
0980	02220		FLOWABLE FILL(BACKFILL-SEWER)	40.00	CUYD		$	
0990	02690		SAFELOADING(ABANDONED CLAY OR PVC PIPE)	84.00	CUYD		$	
1000	03361		COPPER PIPE-1 IN(TYPE K)	190.00	LF		$	
1010	03361		COPPER PIPE-1 IN(TYPE K IN 2 INCH STEEL CASING-PUSHBORED	585.00	LF		$	
1020	03361		COPPER PIPE-1 IN(TYPE K IN 2 INCH STEEL CASING-OPEN CUT)	35.00	LF		$	
1030	03391		PVC PIPE-12 IN(IN 20 INCH STEEL COVER PIPE-BORED&JACKE	155.00	LF		$	
1040	03423		REMOVE METER(AND BOX)	10.00	EACH		$	
1050	03423		REMOVE METER(FIRE PROTECTION VAULT ASSEMBLY)	1.00	EACH		$	
1060	03430		INSTALL WATER METER(SERVICE LINE & RECONNECT TO YARD LINE)	10.00	EACH		$	
1070	03434		REMOVE FIRE HYDRANT	4.00	EACH		$	
1080	03444		RECONNECT SEWER SERVICE	9.00	EACH		$	
1090	03530		GATE VALVE-10 IN(AND BOX)	2.00	EACH		$	
1100	03550		CUT & CAP EXIST WATER MAIN(8 INCH)	5.00	EACH		$	
1110	03550		CUT & CAP EXIST WATER MAIN(SERVICE LINE)	10.00	EACH		$	
1120	20424EC		CONNECT TO EXIST MANHOLE	1.00	EACH		$	
1130	20831ND		REMOVE VALVE BOX(OR ABANDONDED WATER MAINS)	6.00	EACH		$	
1140	20888ED		DUCTILE IRON FITTINGS	5.00	TON		$	
1150	20890ND		CUT AND CAP 10 IN	3.00	EACH		$	
1160	20897ED		CONC FOR CRADLES-ANCHORS AND ENCASEMENT(WATER)	23.00	CUYD		$	
1170	20897ED		CONC FOR CRADLES-ANCHORS AND ENCASEMENT(SEWER)	5.00	CUYD		$	
1180	21114ND		CUT AND PLUG 6 IN	1.00	EACH		$	
1190	21180ND		TAPPING SLEEVE & VALVE 8 X 8(8 INCH VALVE AND VALVE BOX)	5.00	EACH		$	
1200	21213ED		CONCRETE PAVING REPLACEMENT	50.00	LF		$	
1210	21333ED		ASPHALT PAVING REPLACEMENT(WATER)	2,094.00	LF		$	
1220	21333ED		ASPHALT PAVING REPLACEMENT(SEWER)	2,891.00	LF		$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
1230	21900NN		CONN TO SYS VIA TAPPING SLEEVE 6X6X6 IN(6 INCH VALVE AND VALVE BOX)	1.00	EACH		$	
1240	21919NN		MANHOLE-5 FT(CONSTRUCT OVER EXISTING SEWER)	2.00	EACH		$	
1250	21921EN		MANHOLE-4 FT BARREL EXTENSION	32.00	VTFT		$	
1260	21922EN		MANHOLE-5 FT BARREL EXTENSION	7.00	VTFT		$	
1270	21932EN		REMOVE AND REPLACE CURB AND GUTTER (WATER)	150.00	LF		$	
1280	21932EN		REMOVE AND REPLACE CURB AND GUTTER (SEWER)	170.00	LF		$	
1290	21934NN		BYPASS PUMPING	36.00	HOUR		$	
1300	23502EC		FIRE HYDRANT WITH GATE VALVE(6 INCH HYDRANT W/ 6 INCH GATE VALVE)	4.00	EACH		$	
1310	23513EC		CRUSHED STONE PAVEMENT REPLACEMENT	110.00	LF		$	
1320	23717EC		PVC GRAVITY SEWER-6 IN	90.00	LF		$	
1330	23722EC		TAPPING SLEEVE AND VALVE-10 X 10 IN(10 INCH VALVE AND VALVE BOX)	3.00	EACH		$	
1340	23965EC		FIRE SERVICE METER VAULT-6 IN	1.00	EACH		$	
1350	24259EC		MANHOLE DROP CONNECTION	1.00	EACH		$	

Section: 5 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
1360	06406		SBM ALUM SHEET SIGNS .080 IN	146.40	SQFT		$	
1370	06407		SBM ALUM SHEET SIGNS .125 IN	12.50	SQFT		$	
1380	06411		STEEL POST TYPE 2	270.00	LF		$	
1390	20418ED		REMOVE & RELOCATE SIGNS	1.00	EACH		$	

Section: 6 - SIGNALIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
1400	04793		CONDUIT-1 1/4 IN	43.00	LF		$	
1410	04811		ELECTRICAL JUNCTION BOX TYPE B	2.00	EACH		$	
1420	04820		TRENCHING AND BACKFILLING	43.00	LF		$	
1430	04830		LOOP WIRE	2,134.00	LF		$	
1440	04844		CABLE-NO. 14/5C	1,741.00	LF		$	
1450	04850		CABLE-NO. 14/1 PAIR	1,946.00	LF		$	
1460	04895		LOOP SAW SLOT AND FILL	769.00	LF		$	
1470	04950		REMOVE SIGNAL EQUIPMENT	1.00	EACH		$	
1480	20093NS835		INSTALL PEDESTRIAN HEAD-LED	4.00	EACH		$	
1490	20094ES835		TEMP RELOCATION OF SIGNAL HEAD	8.00	EACH		$	
1500	20188NS835		INSTALL LED SIGNAL-3 SECTION	6.00	EACH		$	
1510	20266ES835		INSTALL LED SIGNAL- 4 SECTION	1.00	EACH		$	
1520	21743NN		INSTALL PEDESTRIAN DETECTOR	4.00	EACH		$	
1530	23222EC		INSTALL SIGNAL PEDESTAL	2.00	EACH		$	

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Section: 7 - DEMOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICI	FP	AMOUNT
1540	**02569**		**DEMOBILIZATION**	**1.00**	**LS**		**$**	