CALL NO. 333

CONTRACT ID. 231337

KENTON COUNTY

FED/STATE PROJECT NUMBER FD04 059 3000 000-001

DESCRIPTION HOUSTON ROAD (CS 3000)

WORK TYPE GRADE & DRAIN WITH ASPHALT SURFACE

PRIMARY COMPLETION DATE 8/1/2024

LETTING DATE: September 28,2023

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME September 28,2023. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

PLANS AVAILABLE FOR THIS PROJECT.

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

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PART I

SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 06

CONTRACT ID - 231337

FD04 059 3000 000-001

COUNTY - KENTON

PCN - DE05930002325
FD04 059 3000 000-001

HOUSTON ROAD (CS 3000) EXTEND TO CINEMA PROPERTY, A DISTANCE OF 0.36 MILES.GRADE & DRAIN WITH ASPHALT SURFACE SYP NO. 06-08916.00.

GEOGRAPHIC COORDINATES LATITUDE 30:01:50.00 LONGITUDE 84:36:53.00

ADT

COMPLETION DATE(S):

COMPLETED BY 08/01/2024 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 electronic bidding software. The Bidder must download the bid file located on the Bid Express website (www.bidx.com) to prepare a bid packet for submission to the Department. The bidder must submit electronically using Bid Express.

JOINT VENTURE BIDDING

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

UNDERGROUND FACILITY DAMAGE PROTECTION

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

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

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

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

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

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

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

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

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

HARDWOOD REMOVAL RESTRICTIONS

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

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

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

ACCESS TO RECORDS

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

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

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

BUILD AMERICA, BUY AMERICA ACT (BABA)

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

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

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

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

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

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

BOYCOTT PROVISIONS

If applicable, the contractor represents that, pursuant to KRS 45A.607, they are not currently engaged in, and will not for the duration of the contract engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which Kentucky can enjoy open trade. **Note:** The term Boycott does not include actions taken for bona fide business or economic reasons, or actions specifically required by federal or state law.

If applicable, the contractor verifies that, pursuant to KRS 41.480, they do not engage in, and will not for the duration of the contract engage in, in energy company boycotts as defined by KRS 41.472.

LOBBYING PROHIBITIONS

The contractor represents that they, and any subcontractor performing work under the contract, have not violated the agency restrictions contained in KRS 11A.236 during the previous ten (10) years, and pledges to abide by the restrictions set forth in such statute for the duration of the contract awarded.

The contractor further represents that, pursuant to KRS 45A.328, they have not procured an original, subsequent, or similar contract while employing an executive agency lobbyist who was convicted of a crime related to the original, subsequent, or similar contract within five (5) years of the conviction of the lobbyist.

SPECIAL NOTE FOR RECIPROCAL PREFERENCE

RECIPROCAL PREFERENCE TO BE GIVEN BY PUBLIC AGENCIES TO RESIDENT BIDDERS

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

April 30, 2018

ASPHALT MIXTURE

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

INCIDENTAL SURFACING

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

ASPHALT PAVEMENT RIDE QUALITY CATEGORY B

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

FUEL AND ASPHALT PAY ADJUSTMENT

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

OPTION A

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

UTILITY COORDINATION
BID ITEM DESCRIPTION

Payment under this item is for coordination required and/or delays incurred due to concurrent utility work on the project. This shall include delays incurred due to utility relocations and unforeseen utility repairs not included in the contract plan set and proposal. The contractor shall be responsible for direct coordination with all utility companies involved in the project. The contractor will have to coordinate and work in conjunction with any utility owner, no matter if the road contractor is physically relocating features for that utility owner or not. In addition, it may be necessary to phase work to avoid active utilities that ultimately become inactive. Relocation of those utilities that will ultimately become inactive may either be part of the contract, or the relocation may need to be performed by the utility owner. Other than the amount bid under this item, KYTC will not provide any additional monetary compensation for delays caused during the relocation of any utility.

As provided in the current edition of the KY Standard Specifications for Road and Bridge Construction, working days will not be charged for those days when the road contractor cannot perform work on the controlling operation due to conflicting work, or incomplete infrastructure relocations, beyond the control of the road contractor.

Any changes to the proposed scope and/or schedule of any utility work shall be approved by KYTC.

SPECIAL NOTE

For Tree Removal

Kenton County
CS-3000 New Route Project
Item No. 06-8916.00

NO CLEARING OF TREES 5 INCHES OR GREATER (DIAMETER BREAST HEIGHT) FROM JUNE 1- JULY 31.

If there are any questions regarding this note, please contact Danny Peake, Director, Division of Environmental Analysis, 200 Mero Street, Frankfort, KY 40601, Phone: (502) 564-7250.

SPECIAL NOTE FOR PIPELINE INSPECTION

1.0 DESCRIPTION. The Department will perform visual inspections on all pipe on the project. A video inspection will be required on projects having more than 250 linear feet of storm sewer and/or culvert pipe and on routes with an ADT of greater than 1,000 vehicles. Conduct video inspections on all pipe located under the roadway and 50 percent of the remaining pipe not under the roadway. Storm sewer runs and outfall pipes not under the roadway take precedence over rural entrance pipes. Contractors performing this item of work must be prequalified with the Department in the work type J51 (Video Pipe Inspection and Cleaning). Deflection testing shall be completed using a mandrel in accordance with the procedure outlined below or by physical measurement for pipes greater than 36inches in diameter. Mandrel testing for deflection must be completed prior to the video inspection testing. Unless otherwise noted, Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, current edition.

2.0 VIDEO INSPECTION. Ensure pipe is clear of water, debris or obstructions. Complete the video inspection and any necessary measurement prior to placing the final surface over any pipe. When paving will not be delayed, take measurements 30 days or more after the completion of earthwork to within 1 foot of the finished subgrade. Notify the Engineer a minimum of 24 hours in advance of inspection and notify the Engineer immediately if distresses or locations of improper installation are logged.

2.1 INSPECTION FOR DEFECTS AND DISTRESSES

A) Begin at the outlet end and proceed through to the inlet at a speed less than or equal to 30 ft/minute. Remove blockages that will prohibit a continuous operation.

B) Document locations of all observed defects and distresses including but not limited to: cracking, spalling, slabbing, exposed reinforcing steel, sags, joint offsets, joint separations, deflections, improper joints/connections, blockages, leaks, rips, tears, buckling, deviation from line and grade, damaged coatings/paved inverts, and other anomalies not consistent with a properly installed pipe.

C) During the video inspection provide a continuous 360 degree pan of every pipe joint.

D) Identify and measure all cracks greater than 0.1" and joint separations greater than 0.5".

E) Video Inspections are conducted from junction to junction which defines a pipe run. A junction is defined as a headwall, drop box inlet, curb box inlet, manhole, buried junction, or other structure that disturbs the continuity of the pipe. Multiple pipe inspections may be conducted from a single set up location, but each pipe run must be on a separate video file and all locations are to be referenced from nearest junction relative to that pipe run.

F) Record and submit all data on the TC 64-765 and TC 64-766 forms.

3.0 MANDREL TESTING. Mandrel testing will be used for deflection testing. For use on Corrugated Metal Pipe, High Density Polyethylene Pipe, and Polyvinyl Chloride Pipe, use a mandrel device with an odd number of legs (9 minimum) having a length not less than the outside diameter of the mandrel. The diameter of the mandrel at any point shall not be less than the diameter specified in Section 3.6. Mandrels can be a fixed size or a variable size.

3.1 Use a proving ring or other method recommended by the mandrel manufacturer to verify mandrel diameter prior to inspection. Provide verification documentation for each size mandrel to the Engineer.

3.2 All deflection measurements are to be based off of the AASHTO Nominal Diameters. Refer to the chart in section 3.6.

3.3 Begin by using a mandrel set to the 5.0% deflection limit. Place the mandrel in the inlet end of the pipe and pull through to the outlet end. If resistance is met prior to completing the entire run, record the maximum distance achieved from the inlet side, then remove the mandrel and continue the inspection from the outlet end of the pipe toward the inlet end. Record the maximum distance achieved from the outlet side.

3.4 If no resistance is met at 5.0% then the inspection is complete. If resistance occurred at 5.0% then repeat 3.1 and 3.2 with the mandrel set to the 10.0% deflection limit. If the deflection of entire pipe run cannot be verified with the mandrel then immediately notify the Engineer.

3.5 Care must be taken when using a mandrel in all pipe material types and lining/coating scenarios. Pipe damaged during the mandrel inspection will be video inspected to determine the extent of the damage. If the damaged pipe was video inspected prior to mandrel inspection then a new video inspection is warranted and supersedes the first video inspection. Immediately notify the Engineer of any damages incurred during the mandrel inspection and submit a revised video inspection report.

3.6 AASHTO Nominal Diameters and Maximum Deflection Limits.

Base Pipe Diameter	AASHTO Nominal Diameter	Max. Deflection Limit	
		5.0%	10.0%
(inches)	(inches)	(inches)	
15	14.76	14.02	13.28
18	17.72	16.83	15.95
24	23.62	22.44	21.26
30	29.53	28.05	26.58
36	35.43	33.66	31.89
42	41.34	39.27	37.21
48	47.24	44.88	42.52
54	53.15	50.49	47.84
60	59.06	56.11	53.15

4.0 PHYSICAL MEASUREMENT OF PIPE DEFLECTION. Alternate method for deflection testing when there is available access or the pipe is greater than 36 inches in diameter, as per 4.1. Use a contact or non-contact distance instrument. A leveling device is recommended for establishing or verifying vertical and horizontal control.

4.1 Physical measurements may be taken after installation and compared to the AASHTO Nominal Diameter of the pipe as per Section 3.6. When this method is used, determine the smallest interior diameter of the pipe as measured through the center point of the pipe (D2). All measurements are to be taken from the inside crest of the corrugation. Take the D2 measurements at the most deflected portion of the pipe run in question and at intervals no greater than ten (10) feet through the run. Calculate the deflection as follows:

% Deflection = [(AASHTO Nominal Diameter - D2) / AASHTO Nominal Diameter] x 100%

Note: The Engineer may require that preset monitoring points be established in the culvert prior to backfilling. For these points the pre-installation measured diameter (D1) is measured and recorded. Deflection may then be calculated from the following formula:

$$\% \text{ Deflection} = [(D1 - D2) / D1] (100\%)$$

4.2 Record and submit all data.

5.0 DEDUCTION SCHEDULE. All pipe deductions shall be handled in accordance with the tables shown below.

FLEXIBLE PIPE DEFLECTION	
Amount of Deflection (%)	Payment
0.0 to 5.0	100% of the Unit Bid Price
5.1 to 9.9	50% of the Unit Bid Price [(1)]
10 or greater	Remove and Replace [(2)]

[(1)] Provide Structural Analysis for HDPE and metal pipe. Based on the structural analysis, pipe may be allowed to remain in place at the reduced unit price. [(2)] The Department may allow the pipe to remain in place with no pay to the Contractor in instances where it is in the best interest to the public and where the structural analysis demonstrates that the pipe should function adequately.

RIGID PIPE REMEDIATION TABLE PIPE	
Crack Width (inches)	Payment
≤ 0.1	100% of the Unit Bid Price
Greater than 0.1	Remediate or Replace [(1)]

(1) Provide the Department in writing a method for repairing the observed cracking. Do not begin work until the method has been approved.

6.0 PAYMENT. The Department will measure the quantity in linear feet of pipe to inspect. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24814EC	Pipeline Inspection	Linear Foot
10065NS	Pipe Deflection Deduction	Dollars

SPECIAL NOTE FOR DOLOMITIC POLISH-RESISTANT AGGREGATE IN CLASS A 0.38-IN. AND 0.50-IN. NOMINAL ASPHALT MIXTURES

Contrary to Subsection 403.03.03, when utilizing a dolomitic polish-resistant aggregate as the coarse portion of the Class A 0.38-in. or 0.50-in.-nominal asphalt surface mixture, provide an asphalt mixture conforming to the following requirements:

- 70 percent of total combined aggregate is Class A polish-resistant aggregate.
- Any coarse aggregate utilized in the mixture shall be classified as Class A polish-resistant.
- Non-dolomitic substitutes from other Class A sources may be used as direct substitutes
- All mixes must have DFT testing/results submitted to Division of Materials with any supporting documentation prior to completion of the project.

Dynamic Friction Testing Procedure. Prepare samples for DFT analysis in accordance with PP 104. Friction testing shall be conducted by an AASHTO-accredited facility and data shall be provided in accordance with ASTM E1911 conforming to the following three-wheel polishing schedule. Variations to the testing frequency or methodology shall be coordinated with Division of Materials prior to testing.

Polishing Cycles
5,000
25,000
75,000
150,000

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

TC 62-226
Rev. 01/2016
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RIGHT OF WAY CERTIFICATION

☒ Original	☐ Re-Certification	RIGHT OF WAY CERTIFICATION	
ITEM #	**COUNTY**	**PROJECT # (STATE)**	**PROJECT # (FEDERAL)**
6-8916.00	Kenton	1100 FD04 059 9446501R	
PROJECT DESCRIPTION	Extend Houston Road to Cinema Property. (16CCN)(18CCN) (2020CCR)(LET W/ 6-444)		

☐ **No Additional Right of Way Required**

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

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

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

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

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

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

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

Total Number of Parcels on Project	5	**EXCEPTION (S) Parcel #**	**ANTICIPATED DATE OF POSSESSION WITH EXPLANATION**
Number of Parcels That Have Been Acquired			
Signed Deed	5		
Condemnation			
Signed ROE			

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

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	Lynn Whalen
Signature		Signature	
Date		Date	
Right of Way Director		**FHWA**	
Printed Name		Printed Name	
Signature		Signature	
Date		Date	

UTILITIES AND RAIL CERTIFICATION NOTE

Kenton County
No federal number available
FD04 059 9446501U
Mile point: 0.000 TO 0.310
EXTEND HOUSTON ROAD TO CINEMA PROPERTY. (16CCN) (18CCN) (2020CCR)
ITEM NUMBER: 06-8916.00

PROJECT NOTES ON UTILITIES

The contractor should be aware that there is UTILITY WORK INCLUDED IN THIS ROAD CONSTRUCTION CONTRACT. The Contractor shall review the GENERAL UTILITY NOTES AND INSTRUCTIONS which may include KYTC Utility Bid Item Descriptions, utility owner supplied specifications, plans, list of utility owner preapproved subcontractors, and other instructions. Utility contractors may be added via addendum if KYTC is instructed to do so by the utility owner. Potential contractors must seek prequalification from the utility owner. Any revisions must be sent from the utility owner to KYTC a minimum of one week prior to bid opening.

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

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

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

UTILITIES AND RAIL CERTIFICATION NOTE

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specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom are to be contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

UTILITIES AND RAIL CERTIFICATION NOTE

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

N/A

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

N/A

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

Altafiber – Altafiber has relocations that will begin following completion of Duke Electric relocations. Altafiber will relocate concurrently with road construction using their own resources, if work is not complete prior to the road contractor beginning work. All relocations will be overhead. Altafiber relocations are expected to take approximately one month following completion of Duke Electric relocations.

Charter Communications – Charter Communications has relocations that will begin following completion of Duke Electric relocations. Charter Communications will relocate concurrently with road construction using their own resources, if work is not complete prior to the road contractor beginning work. All relocations will be overhead. Because some of this relocation is fiber, Charter will need to notify their business customers of an outage. Charter relocations are expected to take approximately two months following completion of Duke Electric relocations. Once business customer outage has been approved and scheduled, Charter can complete necessary relocations within two weeks of that scheduled outage.

Duke Energy Kentucky (Electric) – Duke Electric relocation work may start prior to the road contractor's arrival and is expected to be complete by the end of October 2023. Duke Electric will relocate concurrently with road construction using their own resources, if work is not complete prior to the road contractor beginning work. Duke Electric will be relocating 3 poles within the project limits and replacing a 4th that is not affected by this project but needs to be replaced. Duke Electric will also set 2 new pits and transfer existing switchgears to those new pits. One box pad will also be set for the underground feed up the hill in that area. All primary underground will be removed and replaced from the existing manhole to the new pits and from the terminal poles to the new underground facilities.

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EXTEND HOUSTON ROAD TO CINEMA PROPERTY. (16CCN) (18CCN) (2020CCR)
ITEM NUMBER: 06-8916.00

Duke Energy Kentucky (Gas) – Duke Gas distribution main work is expected to start prior to the road contractor's arrival and is expected to be complete by the end of October 2023. Duke Gas will relocate concurrently with road construction using their own resources, if work is not complete prior to the road contractor beginning work. Duke Gas will be installing approximately 1,732 feet of 8" main, 40 feet of 4" main, and 20 feet of 2" main. These facilities will be primarily located right of centerline. The existing gas main will be abandoned in place.

The road contractor shall coordinate and cooperate with all the above utility owners until their relocations are complete.

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

Northern Kentucky Water District facilities are to be relocated by the road contractor using plans inserted into the roadway plans and specifications inserted elsewhere in the proposal.

Sanitation District No. 1 facilities are to be relocated by the road contractor using plans inserted into the roadway plans and specifications inserted elsewhere in the proposal.

These utility owners are to be notified whenever work is being performed on their facilities. Contact information for each utility will be provided at the pre-construction conference.

RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

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

Form Revised 6/24/16

UTILITIES AND RAIL CERTIFICATION NOTE

Kenton County
No federal number available
FD04 059 9446501U
Mile point: 0.000 TO 0.310
EXTEND HOUSTON ROAD TO CINEMA PROPERTY. (16CCN) (18CCN) (2020CCR)
ITEM NUMBER: 06-8916.00

AREA FACILITY OWNER CONTACT LIST

Utility company contacts will be provided at the pre-construction meeting.

Standard Gas Bid Item Descriptions

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

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

G DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of gas main under streets, creeks, etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall be for all sizes and not be size specific. No separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

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

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

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

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

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

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

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

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

G FARM TAP AND REGULATOR This item is for the installation of gas service tap and regulator assembly on a gas transmission main. This item shall include excavation, labor, equipment, and all tapping, piping, fittings, and regulator materials to install the farm tap and regulator assembly in accordance with the plans, specifications, and standard drawings complete and ready for use. Only one pay item has been established for Farm Tap and Regulator installations. Payment shall be made under this item regardless of farm tap service and regulator size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

G MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing gas main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation. All new materials are to be used. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Main Point Relocate shall not be paid on a linear feet basis; but shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

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

G PIPE This description shall apply to all polyethylene/plastic and steel pipe bid items of every size and type to be used as gas main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), corrosion protective coatings of steel pipe and fittings, labor, equipment, excavation, bedding, restoration, pressure testing, backfill, etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. For steel pipe, this bid item shall include all cathodic protection anodes, lead wire, test boxes or stations, and any accessories. No additional payment will be made for rock excavation. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Measurement of quantities under this item shall be through valves (including horizontal measurements through above grade valves), fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility

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

G REGULATOR STATION Includes all labor, equipment, materials and restoration, to install a new gas regulator station as indicated on plans and on standard drawings compete and ready for use. Only one pay item has been established for regulator station installations. Payment shall be made under this item regardless of regulator station size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

G SERVICE SHORT SIDE This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations were both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public

roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

G TIE-IN This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items of every size except those that include a temporary bypass or are defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, restoration, testing and backfill required to make the gas main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

G TIE-IN W/BYPASS This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items that include temporary bypass of every size except those defined as "Special". This item includes all labor, equipment (including tapping, stopple and/or squeeze equipment), excavation, permanent and temporary fittings (including, but not limited to, tees, split tees, bends, reducers, plugs, caps, and couplings), temporary bypass piping, restoration, testing and backfill required to make the gas main tie-in with temporary bypass as shown on the plans, and in accordance with the specifications complete and ready for use. Mainline pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: The tie-in size reflected in the bid item reflects the nominal internal diameter size of the main gas line being tied-in, not the bypass pipe size.

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

for gas valves being installed with new main. This item includes the valve as specified in the plans and specifications, protective coating and corrosion protection, labor, equipment, excavation, valve box and valve stem extensions, backfill, restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

G VALVE ABOVE GRADE This description shall apply to all above grade valve assemblies of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for above grade gas valves being installed with new main. This item includes the above grade valve, pipe, and fittings as specified in the plans, specifications and standard drawings. This bid items shall also include protective coating and corrosion protection, labor, equipment, excavation, backfill, restoration, testing, etc., required to install the specified above grade valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

G WELD X-RAY INSPECTION This description shall apply to all radiographic x-ray inspections of steel pipe joints of every size within the pipe size ranges given in the bid item text. This bid includes all labor, equipment, materials, to assess the acceptability of the weld to comply with specifications and to industry and regulatory standards. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) for each pipe joint inspected.

Specifications for Gas Main Replacement within

STATE OF KENTUCKY ROAD PROJECTS

October, 2022

Note: KYTC has prepared "STANDARD GAS BID ITEM DESCRIPTIONS" for all items of gas work contained in the road contract. These "STANDARD GAS BID ITEM DESCRIPTIONS" are contained elsewhere in the project proposal. These "STANDARD GAS BID ITEM DESCRIPTIONS" shall supersede any and all conflicting information in the following gas specifications. Where conflicts do not exist, the following shall apply.

1.0 GENERAL

1.1 Scope of Work

Gas main relocation work required for the proposed Mt. Zion Rd project consists of the following work:

- Installing approximately 13,236' of 12" plastic gas main. There is also 953' of 6" PL main, 1154' of 4" PL main and 592' of 2" PL main.
- Renewing M-C services as needed. We've estimated that there will be (30) long side services and (16) short side services to be replaced.
- Installing valves per drawings.

A Gas Contractor, approved by Duke Energy, shall perform the gas facility relocation work. **The General Contractor awarded the KYTC road project, shall hire an approved Gas Contractor listed at the end of these specifications.**

A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

1.2 Acceptable Gas Contractors

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

1. AMS Construction
2. RLA Investments
3. Miller Pipeline

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

1.3 Standards

In addition to these specifications, all facilities must be installed in accordance with Duke Energy's Procedures and Standards CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

1.4 Definitions

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

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

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

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

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

1.5 Video Taping

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

1.6 Permits & Fees

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

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

1.7 Operator Qualification

The Duke Energy Learning Services personnel will be responsible for the qualification of the Gas Contractor employees according to Duke Energy Procedures. It is the Contractor's responsibility to ensure those performing covered tasks hold the appropriate Operator Qualifications.

1.8 Security

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

MATERIAL

2.1 Duke Energy Supplied Materials

Duke Energy will provide all:

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

2.1.1 Material Delivery and Tracking

Duke Energy supplied material will be delivered to the job site or Gas Contractor yard. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material.

The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

2.2 Contractor Supplied Materials

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

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

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

Surface Restoration Materials (Temporary and Permanent)
All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

3.0 JOINING PIPE

3.1 Welding Steel Pipe

All welds will be made in accordance with Duke Energy's Gas Division welding procedures and specifications.

3.2 Joining Plastic Pipe

All plastic joining will be made in accordance with Duke Energy's Gas Division plastic joining procedures and specifications.

4.0 GAS MAINS

4.1 Inspection

The road contractor must contact Duke Energy (Missy Vaughan, 513-312-9744) one month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project. Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Project Manager and Gas Inspector AND the KYTC Section Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and

non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Section Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

4.2 Depth and Location of Main

Gas mains on this project shall have 60" of cover from proposed grade under roadways and a minimum depth of 42" in all other areas

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Project Manager and the Gas Inspector AND the KYTC Section Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Section Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.**

4.3 Installation Methods

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

4.3.1 Direct Bury

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 3 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. The minimum trench width shall be 24 inches. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

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

Once the pipe has been placed, trench excavated material or flowable fill shall be used to backfill the remainder of the trench. Trench excavated material shall be placed in the trench and shall be

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

4.3.2 Directional Drilling

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

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

4.4 Backfill

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

4.4.1 Flowable Fill (Low Strength Mortar Material)

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

4.5 Lowering Main in Place

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

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.

- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeeped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 3" of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

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

4.6 Damage to Gas Facilities

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

4.7.2 Casing under Railroad Tracks

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

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

4.9 Pressure Testing

The contractor must supply all labor, equipment, and material to perform and complete the testing of all installed gas mains and services per Duke Energy's Pressure Testing procedure.

4.10 Gas Main Tie-Ins

The Gas Contractor may be required to assist Duke Energy at tie-ins. When assisting Duke Energy at tie-ins, the contractor will be working for Duke Energy and not the General Contractor/KYTC. Contractor will be paid at established rates (not prevailing wage) when performing work for Duke Energy. **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will require squeezing off the main and installing the appropriate saddles. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

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

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

The Gas Contractor may supply additional labor, equipment, and material necessary to abandon mains that are replaced in the road project. All purging, capping, sealing, cutting on main being abandoned or active main in the process of being abandoned will be completed by in house Duke crews.

Tie-ins on many Duke Energy mains are pressure and/or temperature dependent. All tie-ins completed between November 1 and April 30 will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.

4.11 Restoration

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor**; however, the Gas Contractor may have to perform some restoration to maintain traffic and ensure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Section Engineer. The KYTC Section Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

5.0 GAS SERVICES

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

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

5.1 Main to Curb (M-C) Services

M-C services are broken up between short-side and long-side M-C. Method of payment is as defined in Standard Gas Bid Item Descriptions contained elsewhere in the bid proposal. Contrary to past road projects, the length of the gas service to be under or over 15 feet is no longer the determining factor in paying short vs. long side services. The determining factor is defined in the Standard Gas Bid Item Descriptions. The main to curb portion of the service line must have a minimum depth of 60" from proposed grade under roadways and a minimum depth of 42" in all other areas. This is particularly critical when crossing existing or proposed roads with the long-side piping.

5.2 Curb to Meter (C-M) Services

C-M services that do not pass the required pressure test, services that are metallic (steel or copper) or plastic services installed prior to July of 1982 will be renewed. The renewal work shall include turning on and off the services, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set, setting a new meter bracket, replacing the meter as required, and re-lighting the customer appliances. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property.

Existing polyethylene services shall be reconnected to the new mains if it passes testing and was installed in July of 1982 or later. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer appliances that do not pass inspection and notify the Gas Inspector of the problem. Contact the gas inspector whenever anything unacceptable is found.

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

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

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

6.0 DESCRIPTION OF PAY ITEMS

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

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

6.1 Pay Items Billed to the Road Contractor

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

6.1.1 Length of Gas Main Installed

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

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

- Mobilization,
- Saw cutting pavement,
- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,

- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,
- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,
- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

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

6.1.2 Lower Main In Place

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

6.1.3 Boring – No Casing

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

6.1.4 Boring With Steel Casing

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Duke Energy Standards and Procedures. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis

per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

6.1.5 Steel Casing – No Bore (Open Cut)

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

6.1.6 Valve Assembly

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

All valve installations will be made in accordance with Duke Energy's Gas Division plastic joining procedures and specifications.

6.1.7 Main Tie-Ins

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

- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required
- Surface restoration

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

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

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

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

6.2 Pay Items Billed to Duke Energy

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, that is not included in the road contract**.**

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

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

7.0 INVOICING

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

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

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to the Duke Energy sponsoring engineer or project manager. These addendum items should not be invoiced with items that were bid.

7.1 Weekly Pay Sheets

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

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 10/7/22)

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

RLA Investments – 603 Shepherd Lane, Cincinnati, Ohio 45215
Office: 513-554-1469 Fax: 513-554-1221
Contact: Scott Moody, Cell Phone – 513-623-4258, rlainvestment@fuse.net

Miller Pipeline – 4320 Mt Carmel Rd, Cincinnati, OH 45244
Office: 513-271-5616
Contact: Leon Morrison, Cell Phone – 513-582-9024, Lmorrison@ksenergyservices.com

Standard Water Bid Item Descriptions

THESE BID ITEM DESCRIPTIONS SHALL SUPERCEDE ANY BID ITEM DESCRIPTIONS CONTAINED IN UTILITY OWNER SUPPLIED SPECIFICATIONS PROVIDED ELSEWHERE IN THIS PROPOSAL.

W AIR RELEASE VALVE This bid item description shall apply to all air release valve installations of every size except those defined as "Special". This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill, and restoration required to install the air release valve at the location shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready-for-use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

Plugging of existing abandoned mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

W CATHODIC PROTECTION This item is for providing and installing all cathodic protection materials to iron pipe and fittings, as specified in plans and specifications, complete and ready-for-use. Materials to be supplied and installed by the contractor shall include, but are not limited to, anodes, wire, fusion kits, test stations, and/or marker posts. All cathodic protection required for the entire project shall be paid under this one item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

W DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized to minimize the impact of open-cut for the installation of water main under streets, creeks, etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore, whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at

each end of the bore, when specified, to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract, regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

W LINE STOP SIZE 1 OR 2 This item shall include the line stop saddle/sleeve, valve, completion plug and any other material, labor, and equipment necessary to complete the line stop as indicated in the plans and/or specifications. This installation shall allow the waterline system to operate as usual without any interruption of service. The size shall be the measured internal diameter of the live pipe to be tapped. The line stop size to be paid under sizes 1 or 2 shall be as follows:
Size 1 = All live tapped main sizes up to and including 8 inches
Size 2 = All live tapped main sizes greater than 8 inches
Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

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

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

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

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

W METER WITH PRESSURE REDUCING VALVE (PRV) This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches in diameter or less,

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

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

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

Plugging of existing abandoned mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

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

drawings, complete and ready-for-use. If required on the plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

W SERVICE SHORT SIDE This item shall apply to all service line installations of every size up to and including 2-inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plans or specifications), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, disinfection, and restoration at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready-for-use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated, with all work on one side of the public roadway centerline as shown on the plans. The length of

the service line is not to be specified and shall not be restricted to any minimum or maximum length. Placement of a service lateral across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

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

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

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

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

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

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

Plugging of existing abandoned mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

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

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

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

W VALVE BOX REMOVE This item is in payment for all labor, equipment, restoration materials, disposal, and any other effort for removal of a valve box, leaving the valve in place. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE CUT-IN This item is for new cut-in valve installations of all sizes, where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations

shown on the plans, or as directed by the engineer, complete and ready-for-use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE REMOVE This item is in payment for all labor, equipment, and restoration materials for cutting of existing pipe and any other effort necessary for total removal of an existing valve and valve box. This bid item shall include disposal of the valve and box, unless plans or specifications state the valve and box are to be salvaged and delivered to the utility owner for reuse. No separate pay items are to be established for size variations. All valve removals, regardless of size, shall be paid under this one pay item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.
If plugging of existing abandoned mains is needed after valve removal, the work shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

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

WATER RELOCATION SPECIFICATIONS

NORTHERN KENTUCKY WATER DISTRICT

THE FOLLOWING SPECIFICATIONS AND STANDARD DRAWINGS ARE TO BE USED FOR RELOCATION OF NORTHERN KENTUCKY WATER DISTRICT FACILITIES ONLY.

Section II
GENERAL INSTRUCTIONS AND SPECIAL NOTES

1. WATER SHUTDOWNS The Contractor after approval by the NKWD's representative shall notify all affected NKWD's customers a minimum of 48 hours prior to interrupting water service. Notification shall be made by the Contractor using the Northern Kentucky Water District "Interruption of Service Notice". All NKWD's customers shall be notified prior to having their water turned-off to have ample time to draw water for use until service is restored. Under no circumstance shall a customer of the NKWD be without water service overnight. Commercial customers may have additional requirement such as temporary water feed, special shut-down times, etc. If water service or existing water system cannot be interrupt during normal daytime hours due to water needs or high demands, the contractor may be required to conduct the work at night or on the weekend. This work is considered an incidental to the project. No active water main shall be shut down without prior approval of Northern Kentucky Water District. Tie-ins on this project may have to be scheduled at night, on weekends or other off peak hours.

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

3. STATIONS AND DISTANCES All stations and distances indicated in the plans or specifications are approximate, therefore, some minor adjustment may have to be made during construction to fit actual field conditions.

4. FIRE HYDRANT DISCONNECTION No fire hydrant shall be removed from service without prior approval of Northern Kentucky Water District, and the proper fire authority.

5. RESIDENT ENGINEER "Resident Engineer" as referred to in the specifications or in the plans shall mean the KYTC Section Engineer in charge of the project and his inspectors.

6. WATER MAIN INSPECTION Northern Kentucky Water District and their inspectors, and the resident engineer and his inspectors shall be jointly responsible for inspection of water line facilities installation. Where the phrase "as directed" appears in these specifications without defining who is doing the directing, it shall be understood "as directed" means jointly directed by the KYTC Section Engineer and Northern Kentucky Water District

7. PRIOR INSPECTION OF EXISTING METER SETTINGS The Contractor with the Northern Kentucky Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Northern Kentucky Water District standard shall be noted and parts furnished to the Contractor by the Northern Kentucky Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractors expense. Any old water meter settings removed and not reused shall be turned over to the Northern Kentucky Water District.

8. SPECIAL BACKFILL NOTE No sand or granular material shall be used for backfill above 12” over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the KYTC Section Engineer.

9. GENERAL SAFETY For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.

10. MATERIAL HANDLING Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.

11. PROTECTION OF PAVEMENT Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.

12. NOISE, DUST AND ODOR CONTROL The Contractors construction activities shall b conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking will not be permitted.

13. EXCAVATION AND CONSTRUCTION MATERIALS All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorists view.

14. PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractors expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.

15. UNACCEPTABLE EXCAVATED TRENCH MATERIAL Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the Resident Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the KYTC Section Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.

16. BLASTING ROCK No blasting of rock shall be performed without specific permission of the Resident Engineer. Blasts shall be properly covered and all utilities and structures in the area shall be properly protected. Warning shall be given to all persons in the area who could be affected by the blasting. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property caused by the blasting. All blasting shall be performed in accordance with all regulations of the Kentucky Department of Mines and Minerals and all other governing agencies having jurisdiction. The Kentucky Department of

Mines and Minerals, area emergency response agencies, utility companies with utilities in the area shall be notified of the blasting sufficiently in advance.

17. ABANDONED VALVES The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.

18. SALVAGED AND STOCKPILED ITEMS The Contractor shall salvage all items in a workmanlike manner. Any item damaged by the Contractor thru negligence shall be replaced with new items at the contractors expense. All salvaged items to be stockpiled and picked up by NKWD, shall be stored in a safe place until pickup. The Contractor is to notify NKWD at 859-578-9898 when salvaged items are available for pickup.

14. CONSTRUCTION PROCEDURE The successful contractor is to prepare a construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Northern Kentucky Water District's Engineering Department and the KYTC Section Engineer prior to the beginning of the water utilities relocations.

Section III
MATERIAL SPECIFICATIONS

1. CONCRETE All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction, current edition, and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.

2. CONCRETE REINFORCING STEEL All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.

3. WATER MAIN

   A. **DUCTILE IRON PIPE**. Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

      1. Material. The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.

      2. Minimum Thickness. Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 52. All pipe shall be clearly marked as to class by the manufacturer.

      3. Coating and Lining. The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).

      4. Fittings & Glands. Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".

      5. Polyethylene Encasement. Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

   B. **PIPE JOINTS**

      1. Push on and Mechanical. - Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.

      2. Flanged. - Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1

         a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
         b. Bolts. Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

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

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

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

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

4. **FITTINGS**

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

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

2. Coating and Lining. The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).

3. Fittings and Glands. All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.

4. Polyethylene Encasement. Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

B. JOINTS

1. Mechanical. Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.

2. Flanged. Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.

a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.

b. Bolts. Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

3. Restrained. If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.

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

5. POLYETHYLENE WRAP

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

A. Material. Polyethylene wrap shall be a minimum of 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105. Polyethylene tube shall be blue in color.

B. Installation. The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a 1' overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

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

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

For polyethylene wrap of the 24" water main, refer to the "CATHODIC PROTECTION" section of the specifications for special instructions.

6. **FIRE HYDRANTS**

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

B. FIRE HYDRANTS. Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Northern Kentucky Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

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

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

C. INSTALLATION. The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".

D. Polyethylene Encasement Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). .(See Standard Drawing #109)

7. VALVES

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

B. GATE VALVES. Gate valves shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. All external dome and packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the District. All valves shall be designed for a working pressure of 250 pounds per square inch (PSI) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within 3-1/2 feet of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.

B2. DUCTILE IRON RESILIENT WEDGE GATE VALVE WITH BEVELED GEARING. Ductile iron body, non-rising stem, open left, 2” square operating nut, epoxy coated, mechanical joint, inlet and outlet connections, O-ring type packing, resilient wedge, 250 PSI working pressure, and conforming in all other ways to AWWA Standard C515 American Flow Control 2500 Resilient Wedge Gate Valve or approved equal. Valve body to be assembled with stainless steel bolts grade 304 or better. Accessory package (glands, gaskets and bolts) shall not be included. Includes the specified valve, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. (contractor must supply mechanical joint restraints on restrained joint applications), required to install the specified valve at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. All External Dome and Packing Bolts Shall be Stainless Steel.

C. TAPPING SLEEVES AND VALVES. Tapping sleeves and valves shall be designed for a working pressure of 250 psi. The tapping sleeve together with the tapping valve shall be tested at 250 psi for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 350 psi.

1. Tapping Sleeves Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.

2. Tapping Valves Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters for connection to the tapping machine. All external dome , flange and packing bolts shall be stainless steel. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.

D. VALVE BOXES All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft,

screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.

E. BUTTERFLY VALVES. Unless otherwise specified valves 16 inches and larger shall be butterfly valves rated at 250 psi working pressure and conform to the applicable portions of AWWA Standard C504, latest edition.

1. Body - The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of 250 psi. Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.

2. Ends - Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.

3. Discs - Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.

4. Seats - Seats bonded on the discs are not acceptable.

5. Shaft Seals - If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.

6. Operators - The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a 2 inch square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within 3 1/2 feet of the finished grade. Extension stems shall be securely fastened to the valve stem.

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

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

8. **STEEL CASING PIPE**

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

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

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

Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout it’s length, particularly at the ends. There shall not be any metallic contact between the casing and carrier pipe. Casing shall be backfilled with pea gravel or sand after the carrier pipe is installed to prevent pipe movement. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing #104 for installation details.

9. **MATERIAL APPROVAL** Material certification and test samples shall be provided by the Contractor, at the contractors expense, as required by Northern Kentucky Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.

10. **PAVING MATERIALS FOR REPLACEMENT IN KIND** All materials for replacement in kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.

11. **FLOWABLE FILL** This material shall meet the requirements of SPECIAL NOTE 7X of the Kentucky Department of Highways’ Standard Specifications for Road and Bridge Construction.

Section IV
CONSTRUCTION

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

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

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

B. HANDLING. Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.

C. TREE REMOVAL. Stumps of trees designated for removal 12" in diameter and smaller shall be physically removed. Any stump larger than 12" shall be ground down to 6" below final grade level.

D. DEWATERING. Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.

E. CONSTRUCTION EQUIPMENT. Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.

F. TRENCH SUPPORT. Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

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

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

I. TRENCH EXCAVATION AND BOTTOM PREPARATION.

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

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

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

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

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

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

2. Rock The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than 1/2 cubic yard in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.

3. Blasting Rock. No blasting of rock shall be done within 40 feet of pipes or structures without specific permission from the Engineer. Blasts shall be properly covered and the pipe or structure properly protected. Warnings shall be given to all persons in the immediate vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the Contractor.

4. Trench Width. Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

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

Rock

Minimum – 24" or less, nominal pipe size: outside diameter of pipe barrel plus 12”, @ 6” each side.
Minimum - Larger than 24", nominal pipe size: outside diameter of pipe barrel plus 18”, @ 9” each side.
Maximum - nominal pipe diameter plus 24”.

b. Butterfly Valves. Trench width shall be over excavated 24" on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

c. Structures. The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed 12 inches from the outside wall and 6 inches below the footer.

5. Excessive Trench Width. If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.

6. Bottom Preparation The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand or bankrun bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as

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

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

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

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

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

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

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

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

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

3. Push-On Joints. The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.

4. Mechanical Joints. Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.
   1. Bolt Torque The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

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

5. Restrained Joints

   a. Ball and Socket. Ball and Socket joints shall be assembled and installed according to the manufacturers recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

   b. Push-On. Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

6. Setting Valves. Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of 2'x2'x4" concrete pad as shown in Standard Drawing No. 105.

7. Setting Hydrants. Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the

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

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

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

   a. Concrete Blocking. Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.

   b. Tie Rods. If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.

   c. Restrained Fittings. Restrained fittings, where permitted, shall be subject to the approval of the Engineer.

K. TRENCH BACKFILL

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

1. BACKFILL

   a. Trench Bottom Preparation. The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 3" of sand bedding shall be used.

   b. Backfill to 12" Over Pipe Barrel. All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.

   c. Remaining Trench Backfill. From 12" above the pipe barrel to the surface, excavated trench material or flowable fill may be used as backfill material. No material shall be

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

d. Compaction. All backfill shall be placed in uniform loose layers, not to exceed 12" layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.

e. Bulkheads. When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at 100' intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately 3 feet in a direction parallel to the pipe and shall extend from the bottom of the trench to a point 4" below final grade level.

f. Flowable Fill as Backfill As required by the Engineer, flowable fill shall be per Special Note 7X of the Ky. Department of Highways Standard Specifications for Road and Bridge Construction.

g. Surface Conditions. The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.

L. INSTALLATION OF PIPE BY BORING OR JACKING. At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.

M. WATER METERS Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.

N. CONNECTIONS (TIE-INS) TO EXISTING WATER LINES All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized, shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.

O. INSTALLATION OF SERVICE LINES Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36" cover from final grade. The trench width shall be as excavated to a maximum of 2'. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards

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

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

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

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

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

Q. **APPLICABLE SPECIFICATIONS & STANDARDS**

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

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

Section V
DISINFECTION AND LEAKAGE TEST

A. SCOPE. This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for watertightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.

B. TEST SECTION. After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.

C. WITNESS. All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.

D. GENERAL. All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

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

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

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

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

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

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

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

G. DISPOSAL OF HEAVILY CHLORINATED WATER. Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

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

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

Residual Chlorine Concentration *mg/L*	Sulfur Dioxide (SO2)	Sodium Bisulfate (NaHSO3)	Sodium Sulfite (Na2SO3)	Sodium Thiosulfate (Na2S2O3@5H2O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

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

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

H. CHLORINE RESIDUAL TESTS. Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.

I. BACTERIOLOGICAL TESTS. Sampling and testing of water in the main and temporary services will be performed by the District after final flushing. A standard plate count will be made by the District for each sample.

J. REDISINFECTION. Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be

supplied by Contractor at no additional cost to the District.

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

Section VI
VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. REFERENCE MATERIALS Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control" published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.

2. PEDESTRIAN TRAFFIC Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired form the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.

3. VEHICULAR TRAFFIC Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.

Section VII
TEMPORARY AND PERMANENT RESTORATION

1. TEMPORARY RESTORATION Any street, driveway, parking lot, sidewalk, stairs, walls, etc. disturbed by water line construction which is shown on roadway construction plans to be disturbed by roadway construction may be replaced with temporary materials. These temporary materials and their placement shall be approved by the Engineer prior to placement. The cost for temporary paving materials and their placement shall be considered incidental to the cost of water line construction.

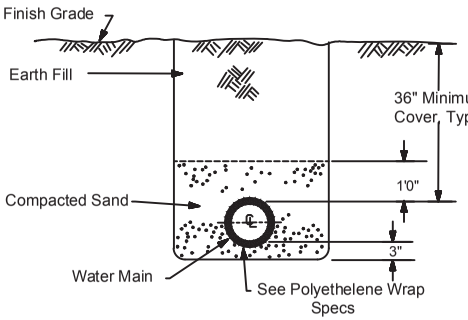
2. PERMANENT RESTORATION Any street, driveway, parking lot, sidewalk, walls, shrubs, etc. disturbed by water line construction, which is shown on roadway construction plans to remain and not be disturbed by roadway construction, shall be replaced in kind. The concrete, asphalt, and stone removed shall be replaced with the same type material, the same thickness as that removed. All pavement shall be removed and replaced to 1' beyond the limits of excavation as detailed on drawing contained herein. These permanent materials and their placement shall be approved by the Engineer prior to placement. The Contractor shall reconstruct same to the original lines and grades and in such a manner as to leave all such items in fully as good or better condition than that which existed prior to construction. All restoration work shall conform to the requirements of KDOH Standard Specifications for Road and Bridge Construction and to the drawing for pavement restoration contained herein. The cost for this permanent restoration shall be considered incidental to the cost of the water line construction.

3. SEEDING AND SODDING This work shall be performed under bid items pertaining to same for roadway construction and in accordance with KDOH Standard Specifications for Road and Bridge Construction.

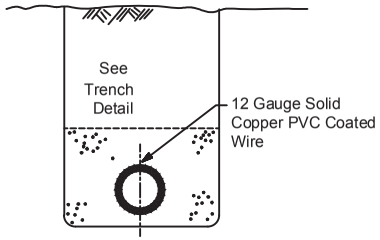
Northern Kentucky Water District

2021

Standard Specifications & Drawings for the Installation of Water Mains

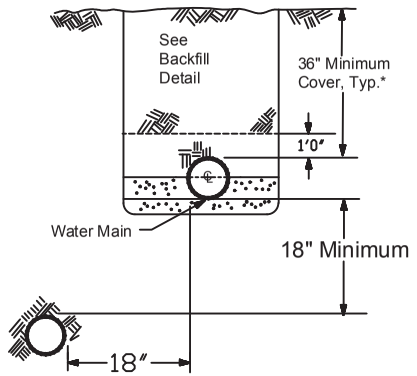


EARTH CUTS
TRENCH DETAIL



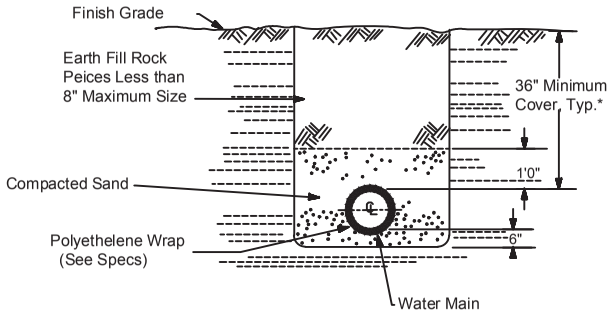
PVC PIPE

ALTERNATE TO BE USED ONLY ON APPROVAL
BY THE DISTRICT



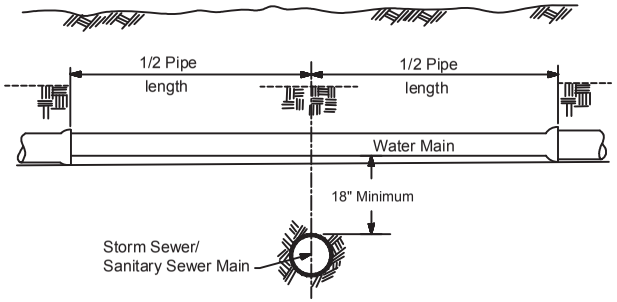
Water Main must be located a minimum of 10 feet lateral distance from anyexisting or future sewer lines or manholes, or as shown in the above alternate.

WATER MAIN PARALLELING
SEWER MAIN



ROCK CUTS
& UNSTABLE SUBGRADE

TRENCH DETAIL



WATER MAIN CROSSING SEWER

SUBDIVISION CONSTRUCTION

* Unless Otherwise Noted

REVISION	BY	DATE
1 8" Max. Rock size	MPS	1/15/93

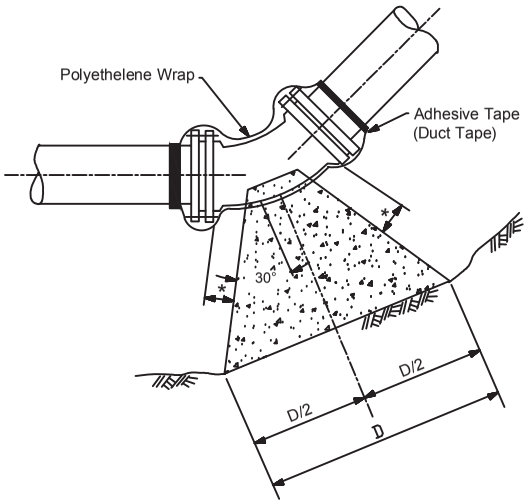
N. KY. WATER DISTRICT
TYPICAL PIPELINE TRENCH
DETAIL

DRAWN BY: SAR

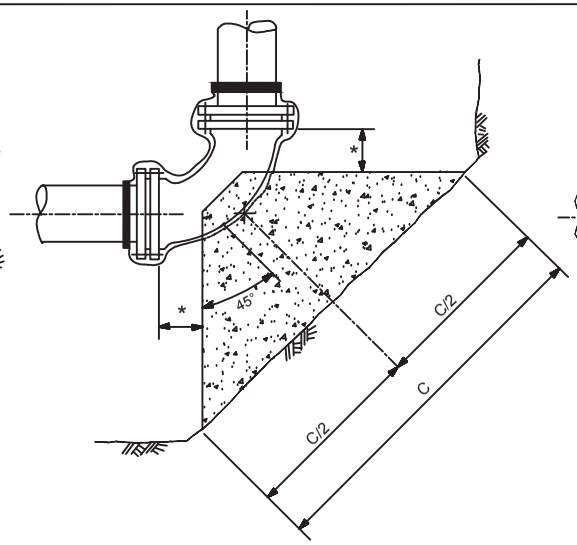
APPROVED:

DATE: 2/1/2021

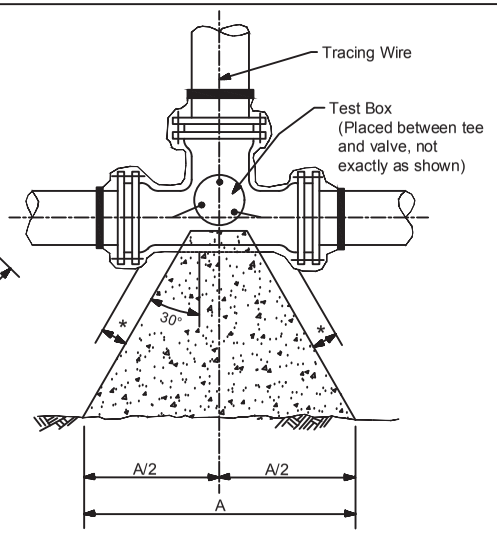
STANDARD DRAWING NO: 103



45° BEND



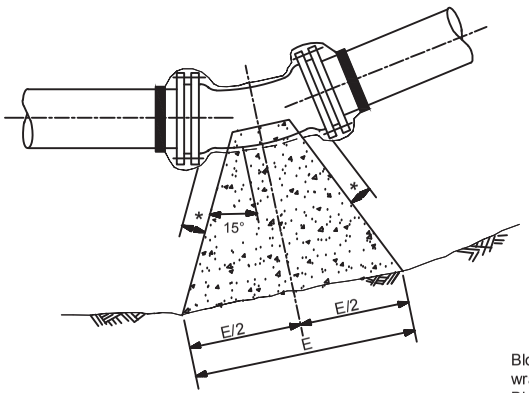
90° BEND



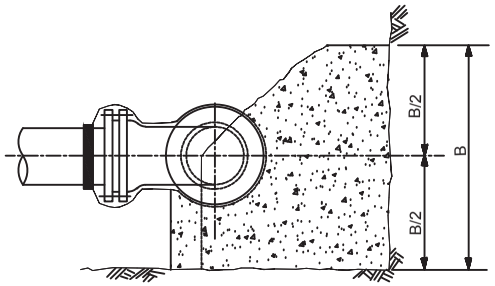
TEE (DEAD END OR FIRE HYDRANT SIMILAP

150 PSI/250 PSI

PIPE SIZE	A	B	C	D	E
6"	2'-6"	2'-0"	3'-0"	2'-0"	2-0"
8"	3'-0"	2'-6"	4'-6"	2'-6"	2'-6"
12"	5'-6"	3'-0"	7'-6"	4'-0"	3'-0"
16"	7'-6"	3'-6"	11'-0"	6'-0"	4'-0"
24"	14'-6"	4'-0"	20'-6"	11'-6"	6'-0"
30"	22'-6"	4'-0"	31'-6"	17'-0"	9'-0"



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

1 DIP Fittings shall be per specifications.
2 Concrete to be 3500 psi.
3 All fittings to be Mechanical Joint.
4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
5 Blocking to be placed in a manner so that bolts can be removed without distrubing the block.
6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psi.

REVISION	BY	DATE

N. KY. WATER DISTRICT

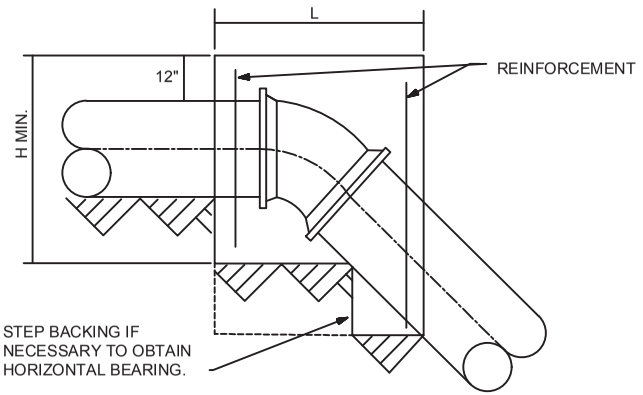
CONCRETE THRUST BLOCK DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

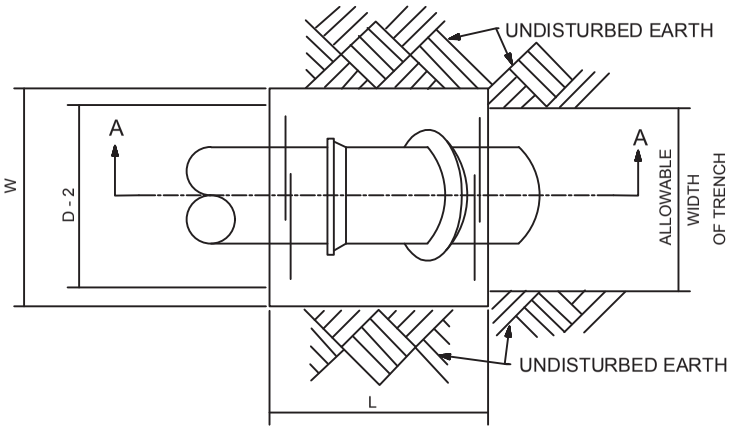
STANDARD DRAWING NO: 104-M



SECTION A-A

SIZE of PIPE	DEGREE OF BEND											
	11 1/4				22 1/2				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1

NOTE: VOLUMES GIVEN IN CUBIC FEET



PLAN

CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.

2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.

3. CENTER BACKING ON BEND.

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

REVISION | BY | DATE

N. KY. WATER DISTRICT

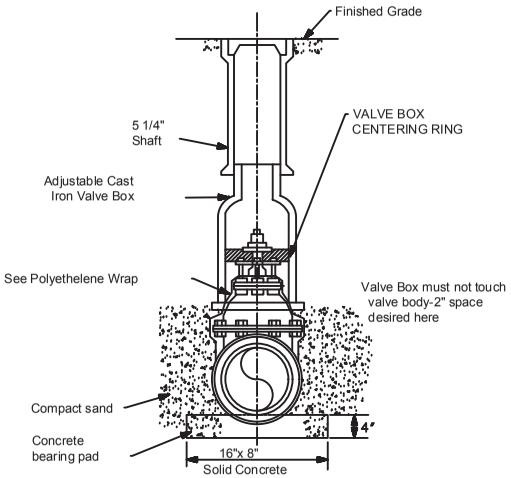
CONCRETE THRUST BLOCKING FOR VERTICAL BENDS

DRAWN BY: SAR

APPROVED:

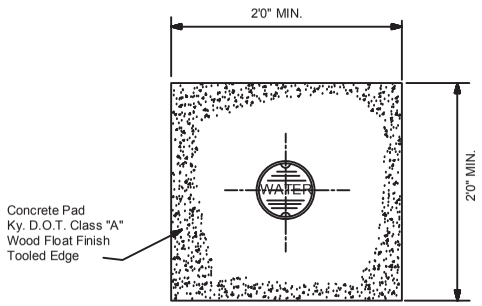
DATE: 2/1/2021

STANDARD DRAWING NO: 104-A

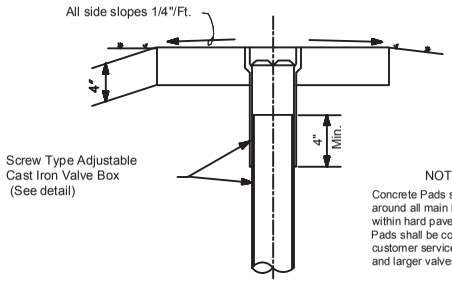


Detail Valve Box Installation

Note:Valve box shall not transmit shock or stress to the valve



PLAN



ELEVATION

NOTES

Concrete Pads shall be constructed around all main line valve boxes except within hard paved areas. Concrete Pads shall be constructed around customer service line valve boxes 3" and larger valves.

REVISION	BY	DATE
* 2'0" Concrete pad use	MPS	6/28/93
Detail Valve Box Installation	MPS	9/22/93

N. KY. WATER DISTRICT

VALVE BOX AND VALVE PAD DETAIL

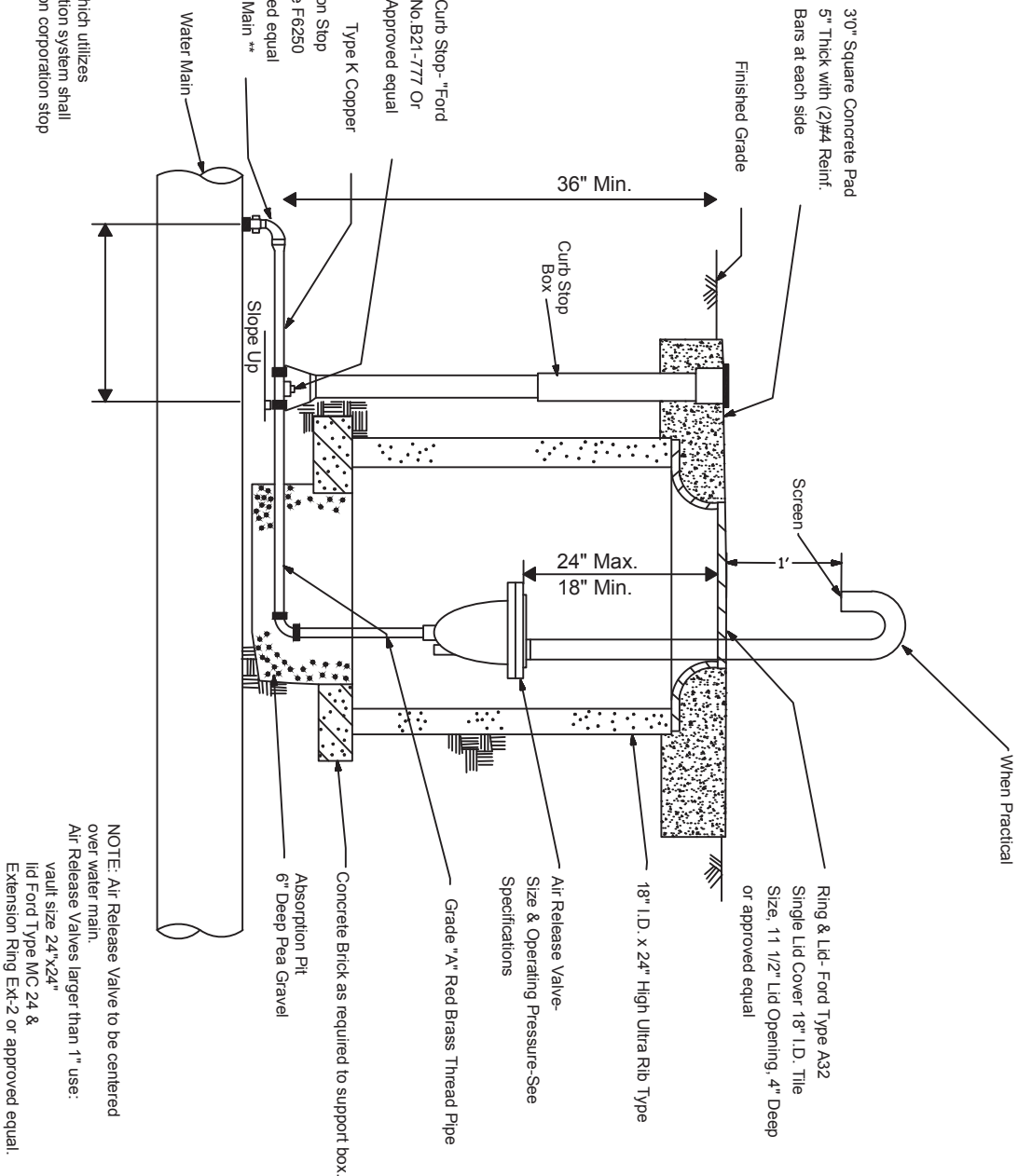
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

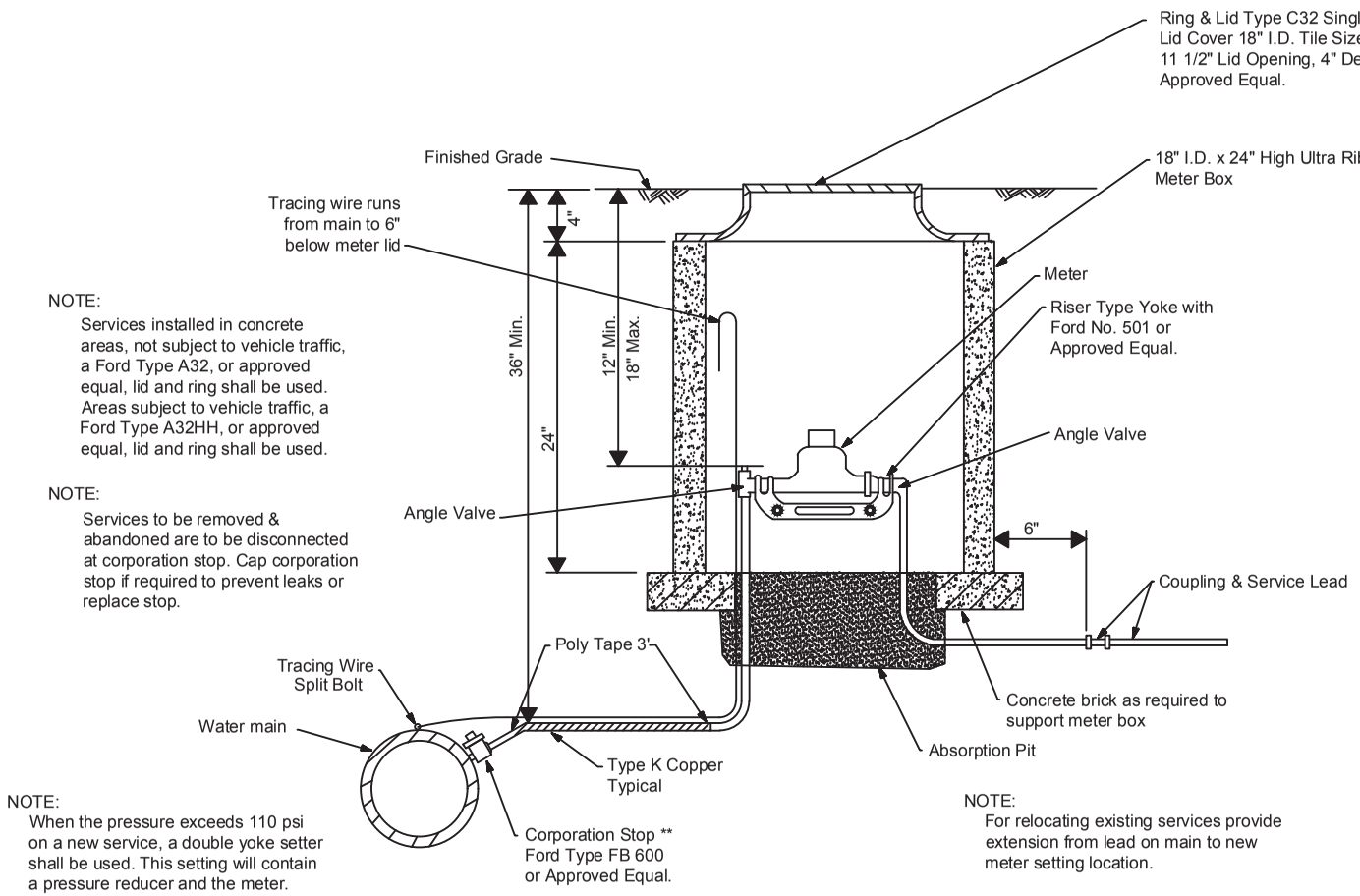
105



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

NOTE: Air Release Valve to be centered over water main.
Air Release Valves larger than 1" use: vault size 24"x24" lid Ford Type MC 24 & Extension Ring Ext-2 or approved equal.

DRAWN BY: SAR	N. KY. WATER DISTRICT	REVISION	BY DATE
APPROVED:	N.KY WATER DISTRICT AIR RELEASE VALE		
DATE: 2/1/2021			
STANDARD DRAWING NO: 106			



NOTE:
Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

NOTE:
Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.

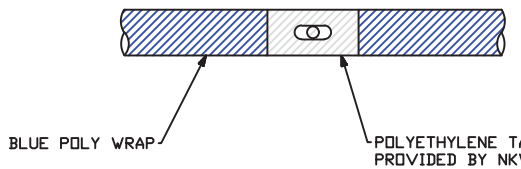
NOTE:
When the pressure exceeds 110 psi on a new service, a double yoke setter shall be used. This setting will contain a pressure reducer and the meter.

PVC Mains-Use single band brass saddle
Ford Type 101 BS or equal.

** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

NOTE:
For relocating existing services provide extension from lead on main to new meter setting location.

ONLY FOR D.I. PIPE



REVISION	BY	DATE

N. KY. WATER DISTRICT

5/8" & 1" METER SETTING
COPPER

DRAWN BY: SAR

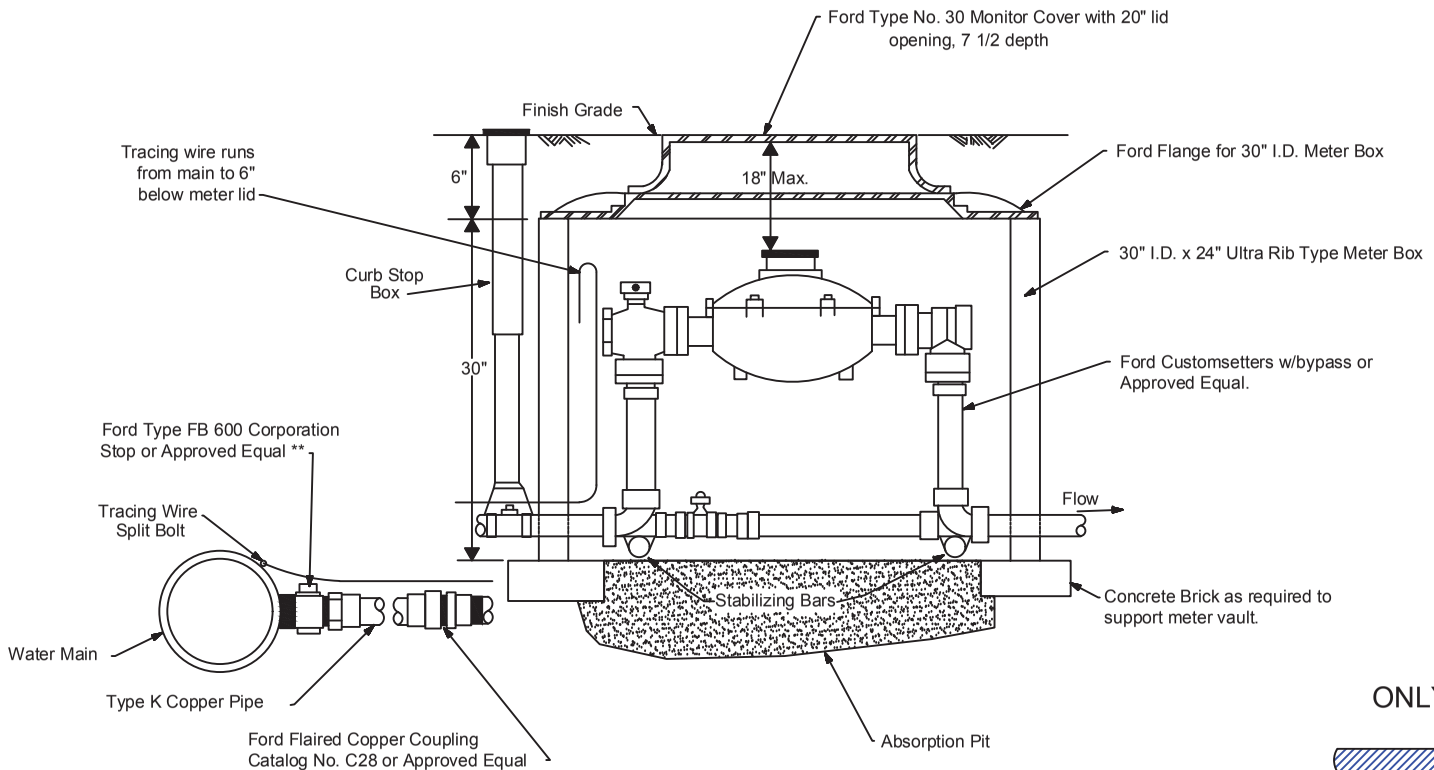
APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 107

Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop. For relocating existing services provide extension from lead on main to new meter setting location.

Note: If service is installed in sidewalk or pavement area,a heavy duty lid shall be installed.

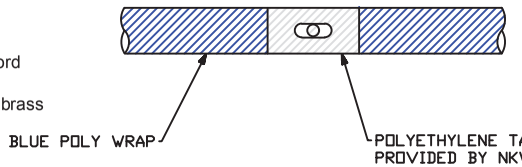


** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

Notes: Pressure regulators are required for new services where the pressure exceeds 110 psi.

Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

ONLY FOR D.I. PIPE



REVISION	BY	DATE

N. KY. WATER DISTRICT

1-1/2" & 2" METER SETTING

DRAWN BY: SAR

APPROVED:

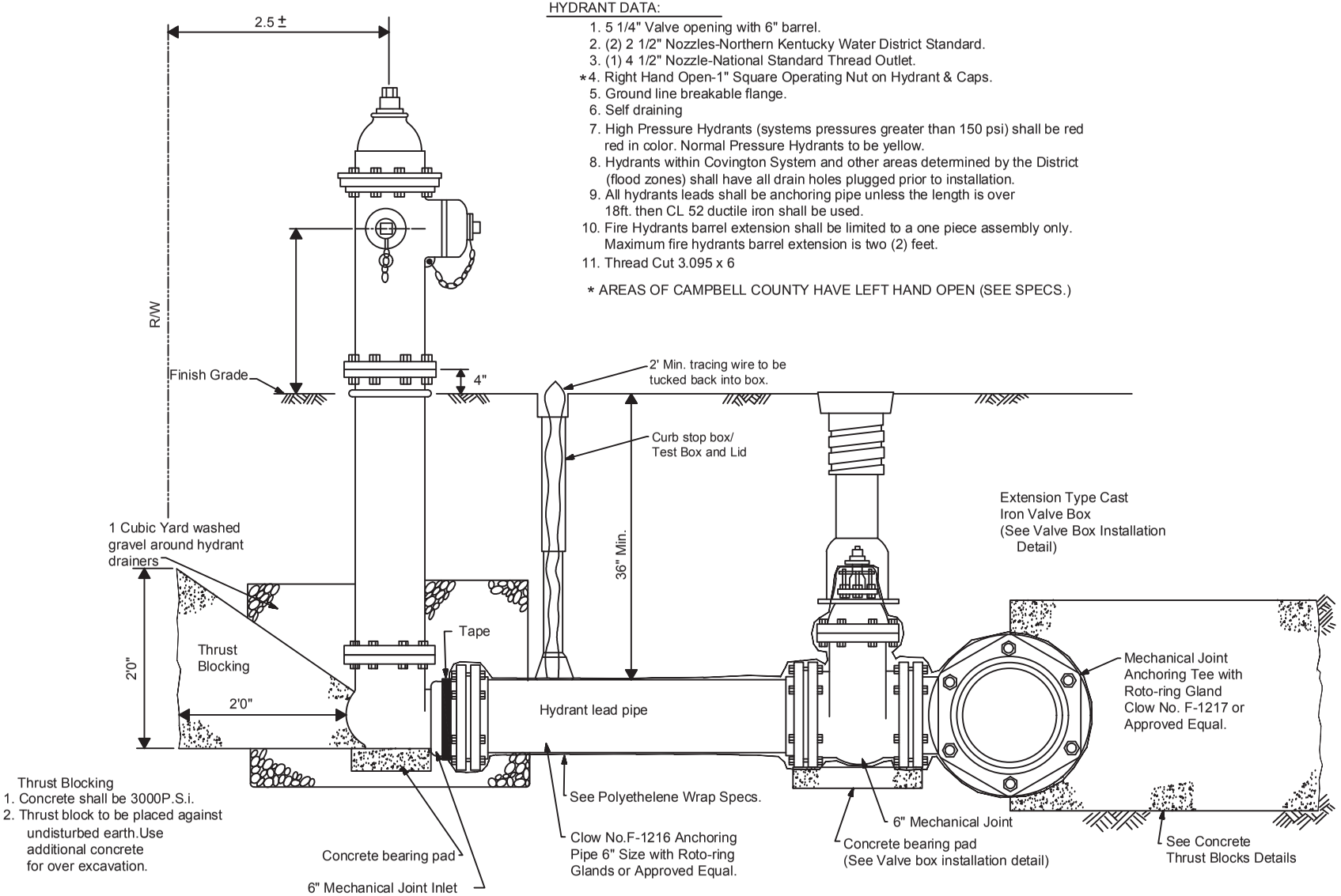
DATE: 2/1/2021

STANDARD DRAWING NO: 108

HYDRANT DATA:

1. 5 1/4" Valve opening with 6" barrel.
2. (2) 2 1/2" Nozzles-Northern Kentucky Water District Standard.
3. (1) 4 1/2" Nozzle-National Standard Thread Outlet.
4. * Right Hand Open-1" Square Operating Nut on Hydrant & Caps.
5. Ground line breakable flange.
6. Self draining
7. High Pressure Hydrants (systems pressures greater than 150 psi) shall be red red in color. Normal Pressure Hydrants to be yellow.
8. Hydrants within Covington System and other areas determined by the District (flood zones) shall have all drain holes plugged prior to installation.
9. All hydrants leads shall be anchoring pipe unless the length is over 18ft. then CL 52 ductile iron shall be used.
10. Fire Hydrants barrel extension shall be limited to a one piece assembly only. Maximum fire hydrants barrel extension is two (2) feet.
11. Thread Cut 3.095 x 6

* AREAS OF CAMPBELL COUNTY HAVE LEFT HAND OPEN (SEE SPECS.)



REVISION	BY	DATE
Blocking,conc.pads,polywrap	MPS	9/22/93
Extension to barrel	MPS	12/22/93
Blocking inside R/W	MPS	10/25/95

N. KY. WATER DISTRICT

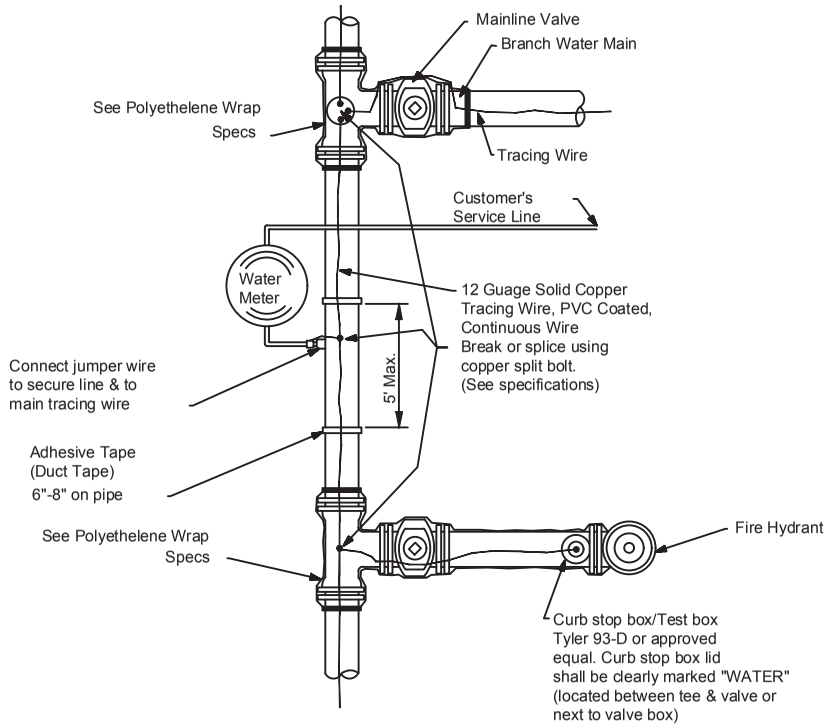
HYDRANT ASSEMBLY

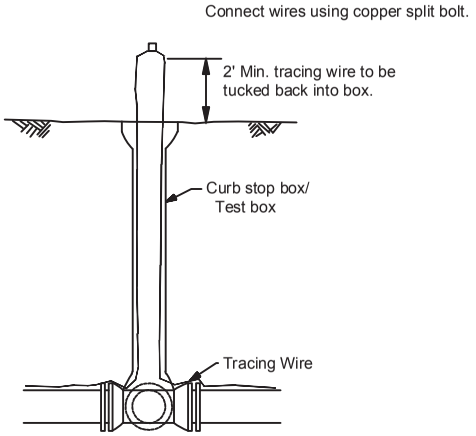
DRAWN BY: SAR

APPROVED: JKK

DATE: 2/1/2021

STANDARD DRAWING NO: 109





DUCTILE IRON AND PVC PIPE WITH DUCTILE IRON FITTINGS

Note: Curb stop box/test box shall not be installed in paved areas.

REVISION	BY	DATE

N. KY. WATER DISTRICT

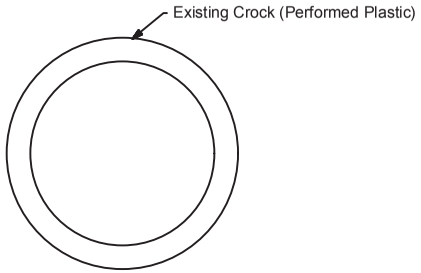
TRACING WIRE INSTALLATION DETAIL

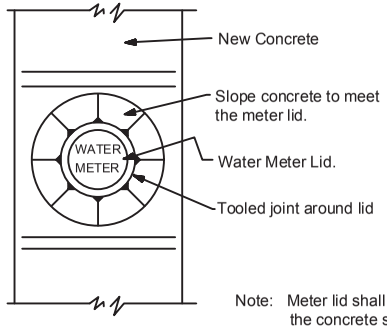
DRAWN BY: SAR

APPROVED:

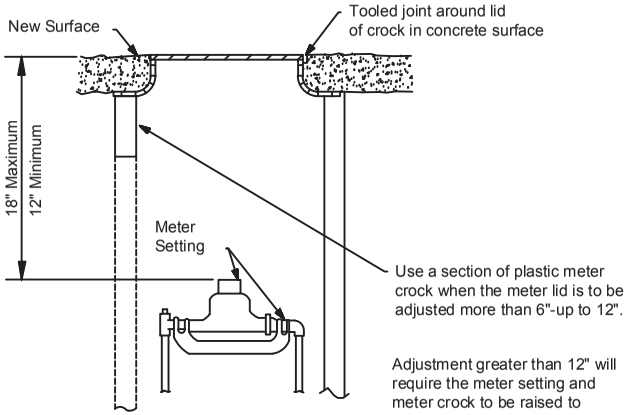
DATE: 2/1/2021

STANDARD DRAWING NO: 111





Note: Meter lid shall be flush with the top of the concrete surface. The concrete surface shall be tapered to provide a smooth transition to the meter lid. A tooled joint shall be formed around the meter lid.



NOTE: SERVICES INSTALLED IN CONCRETE AREAS, NOT SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32, OR APPROVED EQUAL, LID AND RING SHALL BE USED. AREAS SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32HH, OR APPROVED EQUAL, LID AND RING SHALL BE USED.

PLASTIC (PVC) METER CROCKS shall be raised by use of an adapter with a section of plastic crock cut to achieve final grade.

At no time shall wood be used to adjust the ring and lid to grade.

Meter ring and lids shall be reset solidly and shall have no broken edge to allow dirt to enter the crock.

If the meter box is damaged beyond repair it shall be replaced. See Standard Drawing 107.

RAISING CURB STOPS OR VALVE BOXES:

Curb stop boxes and valve boxes shall be raised by turning the upper section to meet grade. If the upper section cannot be raised in this manner it shall be carefully broken off and replaced.

New upper sections shall be supplied by NKWD

REVISION	BY	DATE

N. KY. WATER DISTRICT

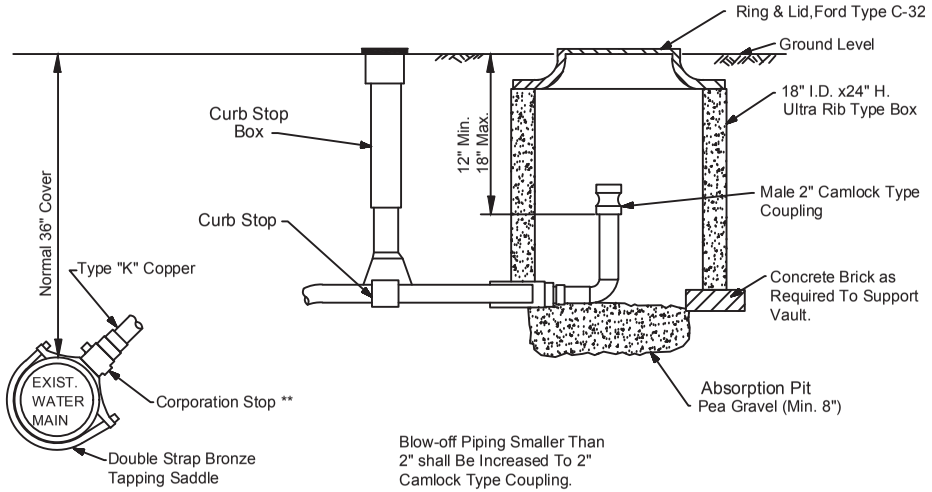
ADJUDTING RING & LID TO GRADE

DRAWN BY: SAR

APPROVED: JKK

DATE: 2/1/2021

STANDARD DRAWING NO: 112



** Taps on mains which utilizes a cathodic protection system shall require an isolation corporation stop

TYPICAL FLUSHING DEVICE INSTALLATION and Manual Air Release Valve N.T.S.

REVISION	BY	DATE

N. KY. WATER DISTRICT

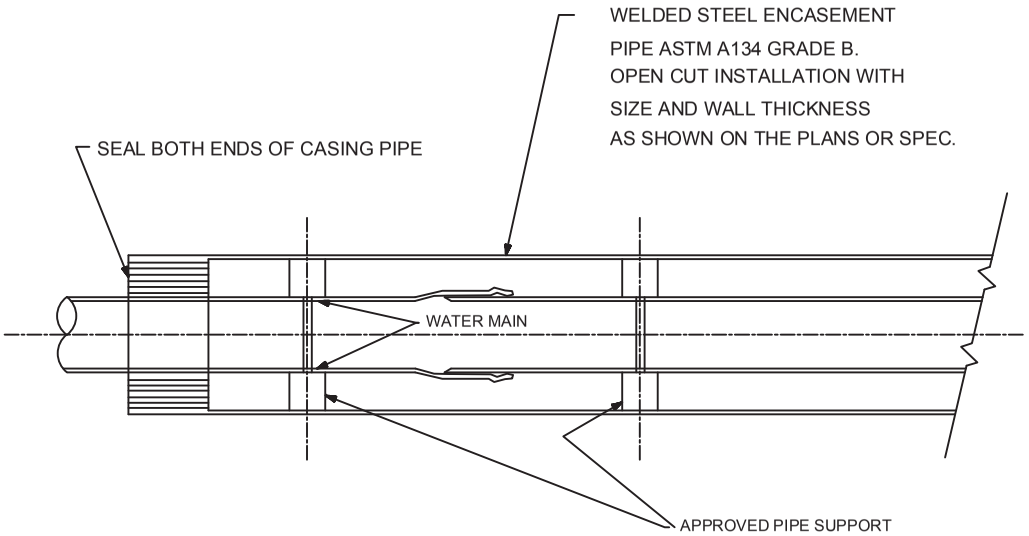
TYPICAL FLUSHING DEVICE INSTALLATION and MANUAL RELEASE VALVE

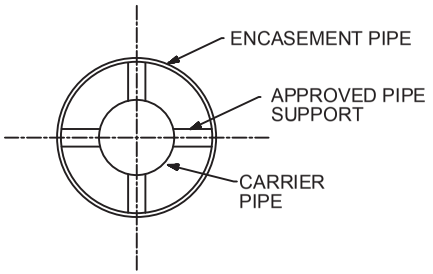
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 113





1. All carrier pipe placed in steel casing pipe shall be minimum class 50 ductile iron pipe and conform to the latest edition of AWWA C151.
2. Carrier pipe gaskets shall develop a wedging action between pairs of high-strength stainless steel elements spaced around the gasket (FIELD LOK , FASTGRIP, or approved equal gaskets).

NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

ENCASEMENT PIPE DETAIL

NO SCALE

REVISION	BY	DATE
1. Remove Granular Fill	JS	2/1/00

N. KY. WATER DISTRICT

ENCASEMENT PIPE DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 114

Northern Kentucky Water District

2021

Standard Specifications & Drawings for the Installation of Meters Pits

PIT CONSTRUCTION SPECIFICATIONS

PART I - GENERAL

1.01 INTRODUCTION Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standard for materials and/or procedures for the construction of meter pits:

1. Northern Kentucky Water District's Standard Drawings
2. Natural Resources & Environmental Protection Cabinet, Division of Water
3. Kentucky Public Service Commission Regulations
4. American Water Works Association Standards (AWWA)

If a conflict exists between referenced sources, the more restrictive requirements shall prevail. The District shall provide interpretation as requested.

1.02 REQUIREMENTS FOR METER PIT INSTALLATION The following are guidelines for meter pit installations:

A. Meter pit will not be required to be installed if the following conditions can be met:
Firelines-1. An approved back flow prevention device shall be installed as the first device inside the building on the fire line before any taps or branches -and-
2. The fire department connection shall be located downstream of the approved back flow prevention device -and-
3. The domestic water service is 2" or smaller which will be installed per Standard Drawings #107, 107-A, or 108.
Domestic Services-- 2" or smaller domestic water services shall be installed by the District per Standard Drawings #107, 107-A, or 108.

B. Meter pits shall be required to be installed if one or more of the following conditions exists:
Firelines-- The fire department connection is required by the authority having jurisdiction to be installed near the public right-of-way. An approved double check assembly shall be required to be installed per Standard Drawing #204, 206, or 207R.
Domestic Services-- 3" or larger domestic water services shall be installed per Standard Drawings #205R, 207R, or 208.

1.03 CONTRACTORS RESPONSIBILITY All work performed on any meter pit and/or appurtenances that are owned or anticipated to be owned by the District shall be completed under the direction of the District adhering to an acceptable plan approved by the District. A minimum of 24 hours notice shall be given to the District by the contractor prior to the start of work. If the interruption of service to any customer of the District is necessary, the Contractor shall make arrangements to provide such shutdown and notify District customers at the direction of the District Inspector. One set of District approved plans shall be on the job site during construction. There shall be no deviation from the approved plans without written approval from the District.

1.04 EXISTING PITS Any changes, modifications, or alterations made to an existing pit structure, piping, etc., it shall be brought up to current standards. Compliance subject to the discretion of the Water District.

1.05 PLANS Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. The proposed project may be constructed only in accordance with the approved plans. Plans submitted to the District for approval shall have a Ky. Professional Engineer or Certified Fire Suppression Technician stamp and signature. Two sets of plans should be submitted for preliminary review and four sets for final review.

1.06 DESCRIPTION In general the following specifications are minimum requirements as pit design. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required upon submission for approval.

1.07 ACCESSIBILITY OF PITS Accessibility for maintenance and testing of all meter pits shall be provided. A means of access for maintenance vehicles shall be constructed of a hard, all weather surface at least 10' wide and designed to support the heaviest vehicle, within 15' of the pit.

1.08 WATER MAINS ON PRIVATE PROPERTY Meter pits and appurtenances installed on private property outside of normal conditions which are going to be maintained by the Water District shall have proper documentation provided for all easement areas. See appropriate sections of District's Standards Specifications & Drawings for the Installation of Water Mains for procedures.

1.09 HIGH PRESSURE AREAS Additional requirements may be necessary for high pressure areas (110 psi static pressure or higher) as determined by the District.

1.10 MAINTENANCE PERIOD The Owner shall be responsible for the maintenance of the installed meter pit and appurtenances to District Standards for a period of not less than one (1) year from the date the meter pit is placed in service by the District. Meter pits will be placed in service when the meter pit is 100% completed to District Standards.

1.11 MINIMUM REQUIREMENTS Floor slab shall be 6" thick concrete sloping at 1/8 inch per foot to drain or sump location. Dimensions of slab shall be 4 inches larger all around than outside pit walls. Pit shall be drained by a 4" drain or larger as required, leading to grade or a storm sewer. When a drain is not practical an electric operated sump pump shall be used.

Walls shall be 8" thick concrete. Top slab shall be 8" thick reinforced concrete with #5 bars @6" O.C. maximum, spanning in short direction and #5 bars @18" O.C. maximum, in long direction. Two (2) #5 bars, two (2) feet long are to be placed at 45 degree to each corner of slab openings. Reinforcing shall be placed 1-1/2" clear from the bottom of the slab or inside wall faces. Additional reinforcement may be required.

Pit openings shall have lids as indicated or as approved in traffic areas of a type operable by a single person. Removable aluminum ladders shall be furnished in all pits.

1.12 METER PIT DIMENSIONS Minimum inside pit dimensions shall be: Height - 5 feet; Width - 5 feet; Length - 6 feet.

REVISION	BY	DATE

N. KY. WATER DISTRICT

MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 201

1.13 QUALITY ASSURANCE

A. Standards: The following publications shall be hereby made a part of these specifications.
1. "Specifications for Structural Concrete for Buildings ACI 301-72 (Revised 1975) with Selected ACI and ASTM Referenced, Sp-15(73)" by the American Concrete Institute.
2. "Placing Reinforcing Bars, CRSI-WCRSI Recommended Practices" by the CRSI-WCRSI Committee on Bar Placing.
3. "Standard Specifications for Road and Bridge Construction by the Kentucky Department of Transportation, Bureau of Hwy. 4.Specifications for the Design and Construction Load-Bearing Concrete Masonry by the National Concrete Masonry Association.

1.14 Or Equal All materials referenced are for design purpose only. Any other materials that are "equal" can be used with prior approval from the District.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete: Ready mixed type meeting K.D.O.T "Class A", 3,500 psi at 28 days compressive strength, 4" maximum slump.

B. Reinforcing Steel: Deformed #5 bars conforming to ASTM A615, A616, or A617, grade 60.

C. Curing Compound: Acrylic based "non-residual" type meeting ASTM C309 Type 1 not less than 18 % to cure, harden and seal concrete.

D. Lid: 48" x 54" double door, aluminum lid with locking padlock bar, centered over the meters, Halliday Products Model #A4854 or approved equal. If padlock bar creates hazard, other locking mechanisms maybe considered.

E. Removable Metal Ladder: Removable metal ladder shall be an approved OHSA Type 1 Industrial Heavy, 250 pound aluminum ladder. Ladder must reach from the pit floor and extend into the pit opening. The bottom of the ladder shall be blocked to prevent it from kicking out but still be removable.

F. Waterproofing: The exterior side of the pit walls shall be waterproofed with one coat of one of the following materials applied in accordance with the Manufacturer's recommendations: Thoroseal; U.S.S. Chemical Tarmastic #102; Koppers Bitumastic Super Service Black; Damchex; Amercoat #78; or an approved equal.

Voids between pipes and chamber walls shall be grouted with a hydraulic cement such as Waterplug or an approved equal before waterproofing pit.

G. Waterstop: A waterstop shall be provided in the pit floor to the pit walls.

H. Floor Drain: Raised or beehive dome grate, 4" minimum, similar to Wade #1634; Josam #7324-N; or an approved equal.

I. Pit Drain Line: Cast iron, Schedule 40 PVC, Plastic STM #35 or ductile iron, 4" minimum.

J. Alternate To Pit Drain Line: Electric Submersible Sump Pump, Little Giant, Big John, Stock #3P-639A Model #6-CIA or approved equal. Note: This alternative shall only be used when a drain line is impractical as determined by the District. (See drawing #202 & Part 4 of Pit Specifications)

K. Packaged, Prefab Meter Vaults: Packaged, prefab meter vaults are acceptable with approval from the Water District.

PART 3 - EXECUTION

3.01 WORKMANSHIP Earth cuts may be used for forms of base slab provided vertical sides are kept true and sharp. All embedded items, reinforcing, piping, etc. shall be secured in place prior to placing of the concrete. Concrete shall be protected from loss of moisture for a curing period of at least 7 days. All concrete shall be deposited within 1-1/2 hours following the initial mixing of water and cement. Wall finish may be a rough form finish. Top slab finish shall be wood float with tooled edges.

PART 4 - ELECTRIC SUMP PUMPS

4.01 DESCRIPTION In general the following specifications are a minimum requirements for the design and installation of Electric Submersible Sump Pumps in meter pits where a normal drain line is impractical.

4.02 ELECTRIC WORK All electric work shall be installed according to the National Electric Code and all other applicable codes. All work shall be inspected by an Electrical Inspector and certification provided to the District.

4.03 RESPONSIBILITY The property owner is responsible for providing continuous electric service for the electric sump pump at the owner's expense. The property owner shall be responsible for the maintenance and upkeep of all electrical boxes, conduit, circuit breaker box, circuit breaker, outlet and wiring outside the pit.

4.04 MATERIALS

A. Electric Submersible Sump Pump: Electric sump pump shall be U.L. Listed, Little Giant, Stock #3P639, Model #6-CIA.

B. Electric Junction Box: Water resistant, U.L. Listed, P.V.C electrical box shall be installed on the inside of the pit on the wall closest to the sump pump nearest the ceiling.

C. Electrical Piping: Electric piping shall be U.L. Listed for underground use, rigid or plastic installed at least 18" below grade.

4.05 INSTALLATION

A. Sump Pump Hole: A 4" deep hole shall be provided in the floor of the pit.

B. Discharge Piping: Piping for the water discharge from the electric sump pump shall be plastic or copper. Minimum piping size shall be 1 1/2". A 1/8" hole shall be bored above the check valve of the discharge pipe if freezing temperatures will affect the pipe.

C. Water Discharge: Water discharge shall be directed into a storm sewer or drainage ditch, if this is impractical, water discharge shall be directed on to a 16" x 16" concrete pad.

D. Electric Service Line: The electric line to the pit shall be only used for the pit sump pump, no other electrical taps shall be made on this line.

E. Manufacturer Instructions: Manufacturer's instructions should be followed for installation.

REVISION	BY	DATE

N. KY. WATER DISTRICT

MATERIAL SPECIFICATIONS FOR PIT CONSTRUCTION

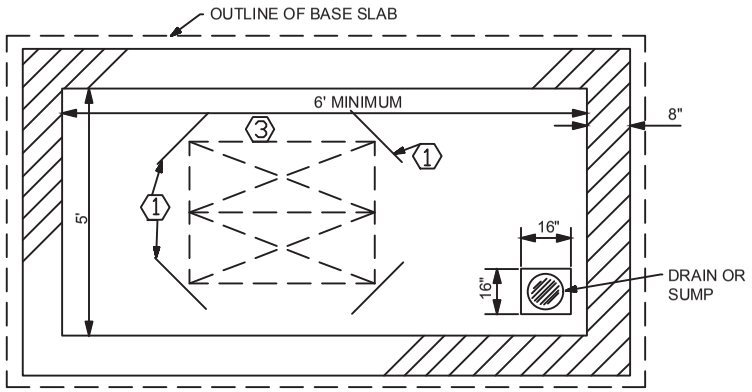
DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

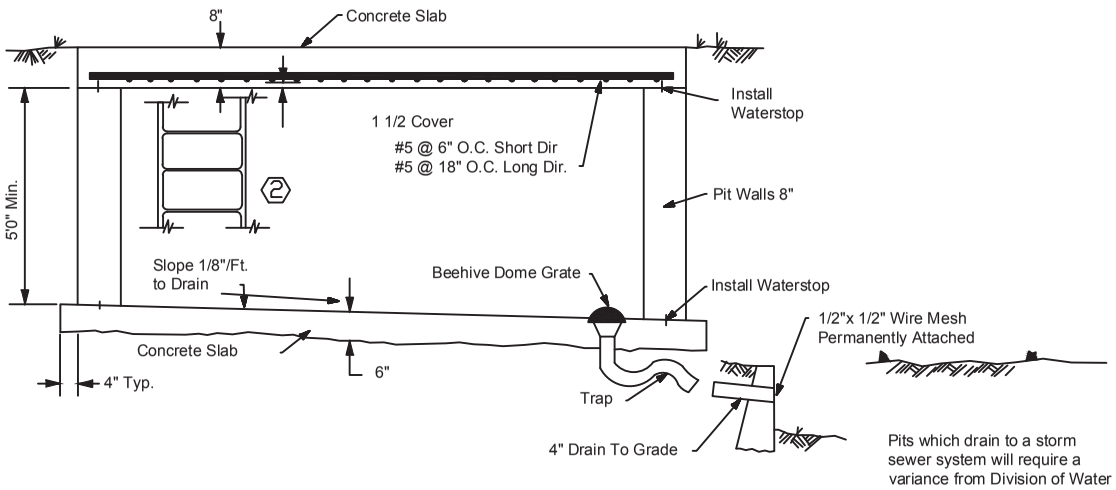
201-A



DRAWING NOTES

1. (2) #5 Reinforcing Bars, 2'6" Long @ 45 Each Corner of Lid or Pit Opening.
2. Removable ALuminum Ladder Within Pit.
3. Lid In Top Slab To Be Centered Over Meter(S). Lids Shown Are For Non-Traffic Area Locations.

   Lids Within Traffic Areas Shall Be Guarded With Approved Post Surrounding The Pit Or Lid, Or The Lid Shall Be Adequate To Support The Imposed Weight And Be Operated By A Single Person As Approved By K.C.W.D. #1.



Pits which drain to a storm sewer system will require a variance from Division of Water

REVISION	BY	DATE
LID & SUMP PUMP	MPA	10/4/90

N. KY. WATER DISTRICT

TYPICAL PIT DETAIL

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 202

PART 1 - PRODUCTS

1.01 MATERIALS

A. Underground Piping & Appurtenances: All underground piping and appurtenances shall conforms to appropriate sections of District's "Standard Specifications & Drawings for the Installation of Water Mains". All underground piping 4" and larger shall be polyethylene wrapped Class 50 or higher Ductile Iron Pipe from the public water main to the meter pit.

B. Piping Inside Pits: Pipe installed inside the pit shall be a minimum thickness of Class 53 flanged ductile iron pipe for 3" and larger piping. The pipe shall extend through the pit walls.

C. Fittings: All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the Northern Kentucky Water District require materials used, to be of a higher working pressure than 200 psi.) All pipe fittings inside the meter pit shall be flanged.

D. 2" and Smaller Service Branch Lines: Type K or L copper conforming to ASTM B88. Valves, fittings, and nipples shall be brass.

E. Gate Valves 3" & Larger, Inside Pit: Conforming to AWWA Standard C509. Outside stem and Yoke (OS&Y), ductile iron body, left hand open, resilient wedge, wheel operated, flanged connection, gate valves. Clow Resilient Wedge Gate Valve or approved equal. Valves installed as part of a back flow prevention assembly shall be approved by the F.C.C.C.R., U.S.C.

F. Valves 2" % Smaller: All 2" and smaller valves shall be ball valves.

G. Glands, Gaskets, Bolts & Nuts: Conforming to AWWA C111.

H. Bypass Lines on 3" & Larger Meter Lines: A bypass line of equal or one size less than the domestic line shall be installed on all domestic meter services 3" or larger. Minimum bypass line size is 3".

I. Meters: As purchased from Northern Kentucky Water District.

J. Pressure Reducing Valves: On domestic lines, pressure reducing valve will be required to be installed when the static system pressures is at or above 125 psi. They will be installed before the meter and are installed to protect the meter only. The District will not be liable for any damage due to pressure conditions caused by or arising out of the failure or defective condition of such pressure regulator or for damage that may occur through the installation, maintenance, or use of such equipment. Pressure reducing valves shall be installed at least 5 pipe diameters away from the meter. Cla-Val Model 690-48 shall be installed on 3" and larger lines. This may also include electronic devices, sight gauge, or any other such devices per District requirements.0 thur 300 psi gauges shall be provided on the inlet and outlet sides of the pressure reducing valve.

K. Back flow Prevention Assembly: All assemblies shall be listed and approved by the Foundation for Cross-Connection Control Research, University of Southern California (F.C.C.C.R.,U.S.C.) and the District. The testable assembly consists of the back flow prevention unit and two approved shut-off valves. Valves shall be full port ball valves for 2" and smaller and outside stem and yoke, resilient wedge, left hand open, gate valves for 3" and larger. Assemblies shall be delivered completely assembled by the original manufacturer with all components as approved by F.C.C.C.R.,U.S.C. The assembly shall not be separated or altered in anyway. The type of back flow prevention assembly to be installed shall be determined by the N.K.W.D. (see Back flow Prevention Device Assembly Standard Drawings Figure II-a for general guidelines). All approved back flow devices shall be tested and certified that it works properly after system activation. Special permission must be obtained from the District to install a reduced pressure back flow prevention assembly in a pit.

L. Booster Pumps: Booster pumps 3" and larger installed on water lines shall be equipped with a Pump Suction Control Valve and/or a Low Pressure Cut-off Device which is designed to modulate the pump discharge or shut-off the booster pump when the pressure on the suction-side of the pump drops to 20 psi.

These devices shall be designed to prevent water hammer to the public water system. Pump Suction Control Valve and/or a Low Pressure Cut-off Device shall be inspected and tested for proper operation at the time of installation and at least annually thereafter. The property owner shall maintain a complete record of all test, inspections and repairs to the devices. The devices shall not be bypassed, made inoperative, or removed without authorization from the District.

PART 2 - EXECUTION

2.01 INSTALLATION

A. Pipe Laying: Conforming to AWWA Standard C600. Maintain a minimum pipe cover of 3'-0" with continuous pipe support for entire length. All underground piping and appurtenances shall be installed according to appropriate sections of District's "Standard Specifications & Drawings or the Installation of Water Mains".

B. Pit Components: Adequately supported by solid concrete blocks or supports set on the floor slab. 2" or smaller domestic service lines may be supported by brackets mounted on the pit wall.

C. Anchorage: Inlet valves on 3" or larger piping shall be securely anchored to the pit wall when piping is sleeved through the wall. Additional rodding may be required at the discretion of the District.

D. Disinfection: The interior of all surfaces in contact with the potable water system, tapping sleeve, valves, couplings and pipe shall be swabbed with a 5 % hypochlorite solution prior to installation.

E. Valve Box Protection: The valve box over the tapping sleeve if located outside of a hard paved area shall have a minimum 2'x2'x4" square pad cast around the lid. Refer to standard drawing No. 105.

F. Flushing of Mains: Lines shall be flushed at a rate 2.5 ft/s.

REVISION	BY	DATE

N. KY. WATER DISTRICT

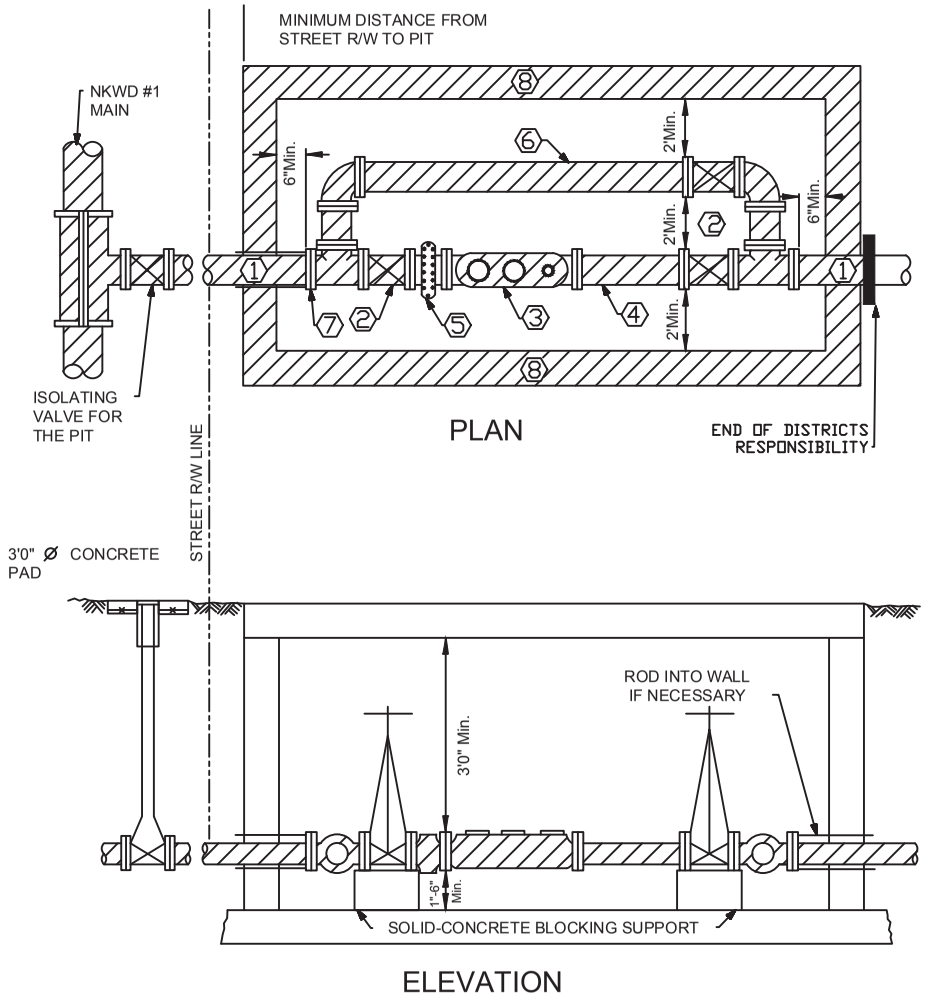
PIPING SPECIFICATIONS FOR PIT CONSTRUCTION

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO: 203



DRAWING NOTES

1. PIPING CLASS 52 WITH FLANGED END WITHIN PIT.
2. VALVES WITH OUTSIDE SCREW AND YOKE, FLANGED CONNECTIONS. (RESILENT SEATED VALVES)
3. 2.5"" OR LARGER COMPOUND METER
4. FLANGED COUPLING ADAPTER OVER PLAIN END PIPE FLANGED BY PLAIN END PIPE.
5. STRAINER
6. BYPASS LINE SHALL BE EQUALIVANT IN SIZE AS THE FEED LINE OR THE NEXT SIZE SMALLER (3" MININUM SIZE)
7. If system pressures exceed 110 psi, a regulator SHALL BE INSTALLED AS SHOWN (DWG NO. 201 item No. 1.09)
8. SHADED AREA DISTRICTS RESPONSIBILITY

GENERAL NOTES

1. SEE DRAWING 202 FOR PIT CONSTRUCTION DETAILS.
2. SEE DRAWING 201 FOR PIT MATERIALS SPECIFICATIONS.
3. SEE DRAWING 203 FOR PIPING SPECIFICATIONS.
4. An approved Double Check Valve Assembly shall be required on Fire Lines by the following governing bodies: Kentucky Public Service Commission, Kentucky Division of Water, and Kentucky Division of Plumbing.

REVISION	BY	DATE
COMPOUND METER ETC.	MPA	10/9/90
NOTE 4-GEN. NOTE	MPA	2/6/92

N. KY. WATER DISTRICT

METER SETTINGS
2.5" AND LARGER

DRAWN BY: SAR

APPROVED:

DATE: 2/1/2021

STANDARD DRAWING NO:

205-R

Standard Sanitary Sewer Bid Item Descriptions

THESE BID ITEM DESCRIPTIONS SHALL SUPERCEDE ANY BID ITEM DESCRIPTIONS CONTAINED IN UTILITY OWNER SUPPLIED SPECIFICATIONS PROVIDED ELSEWHERE IN THIS PROPOSAL.

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

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

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

S CIPP LINER This item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract. All CIPP Liner items, of all varying sizes, shall include all labor, materials, customer notification, testing, necessary permits,

ingress and egress procedures, bypass pumping, pre-construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning, video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing, and all other rehabilitation work and incidentals not included under other pay items, necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

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

S CONCRETE PIPE ANCHOR This item shall be constructed on the sewer pipe at the locations shown on the plans, in accordance with sanitary sewer specifications and standard drawings. Payment for concrete anchors will be made at the contract unit price each, in place, complete and ready-for-use. Each concrete anchor of sewer pipe or force main shall be paid under one bid item per contract regardless of the sizes of carrier pipe being anchored in the contract. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

S ENCASEMENT CONCRETE This item includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, etc. to construct the concrete encasement of the sewer or force main, as shown on the plans and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe, as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasements shall be paid under one bid item, included in the contract, regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of

pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

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

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

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

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

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

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

S FORCE MAIN This item description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test stations (if required by specifications), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, backfill, etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings, complete and ready-for-use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and

proposed pavement, and wherever else specified on the plans or in the specifications. This item shall also include pipe anchors on polyethylene pipe runs, as shown on the plans or required by the specifications, to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

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

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

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

basis, but shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

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

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

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

S FORCE MAIN TIE-IN This item description shall be used for all force main tie-in bid items of every size, except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, testing, and backfill required to make the force main tie-in as shown on the plans and in accordance with the specifications, complete and ready-for-use. This bid item shall include purge and sanitary disposal of any sewage from any abandoned segments of force main. Pipe for tie-ins shall be paid under separate bid items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

Plugging of existing abandoned mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

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

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

S LAMPHOLE Payment under this item is for the installation of a lamphole along or at the end of a gravity sewer pipe for inspection and cleaning of a sewer pipe. Lampholes shall include, but are not limited

to bends, tees, vertical pipe, casting, any other materials specified, excavation, backfilling, air testing, restoration, and cleanup in accordance with the plans, specifications, and standard drawings, complete and ready-for-use. Payment shall be made under this bid item regardless of lamphole size. No separate pay items will be established for size variations. All materials shall be new and unused. No additional compensation will be paid for lamphole height variations. All vertical pipe required to construct the lamphole, regardless of height, shall be considered incidental to this item. No additional payment will be made for rock excavation. Cleanouts on pipes 6 inches or less are not considered lampholes and are not to be paid under this item. Only lampholes on pipes 8 inches or larger are to be paid under this item. Cleanouts on pipes 6 inches or less are to be paid under pay item S LATERAL CLEANOUT. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL CLEANOUT This item shall be for payment for installation of a cleanout in a service lateral line. This item shall include furnishing and installation of a tee, vertical pipe of whatever length required, and threaded cap. The cleanout shall extend from the lateral to final grade elevation. The size of the cleanout shall be equivalent to the size of the lateral. The cleanout materials shall meet the same specification as those for the lateral. The cleanout shall be installed at the locations shown on the plans or as directed by the engineer. Only one pay item shall be established for cleanout installation. No separate pay items shall be established for size or height variations. Payment under this item is for cleanouts on pipe of 6 inches or less. Cleanouts on pipes of 8 inches or greater are considered lampholes and shall be paid under the S LAMPHOLE bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL LOCATE This item description is to pay for all labor, equipment, and materials needed in locating an existing sanitary sewer service lateral for tie-in of the lateral to new mainline sewers and/or for the relocation of a lateral. This bid item shall be inclusive of all methods and efforts required to locate the lateral for tie-in or relocation of the lateral. Locating methods to be included under this item shall include, but are not limited to those efforts employing the use of video cameras from within an existing sanitary sewer main or lateral, electronic locating beacons and/or tracers inserted into the sanitary sewer main or lateral, careful excavation as a separate operation from mainline sewer or lateral excavation, the use of dyes to trace the flow of a lateral, or any combination of methods required to accurately locate the lateral. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

S LATERAL LONG SIDE This item description shall apply to all service lateral installations of every size up to and including 6-inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready-for- use. This bid item is to pay for service lateral installations where the ends of the lateral connection are on opposite sides of the public roadway. The new lateral must cross the centerline of the public roadway to qualify for payment as a long side lateral. The length of the service lateral is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service lateral across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL SHORT SIDE This item description shall apply to all service lateral installations of every size up to and including 6-inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap tee, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready- for-use. This bid item is to pay for lateral installations where both ends of the lateral connection are on the same side of the public roadway, or when an existing lateral crossing a public roadway will remain and is being extended, reconnected, or relocated, with all work on one side of the public roadway centerline as shown on the plans. The length of the service lateral is not to be specified and shall not be restricted to any minimum or maximum length. Placement of a service lateral across a private residential or commercial entrance along shall not be reason to make payment under this item Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

S MANHOLE Payment under this item is for the installation of new 4-foot interior diameter sanitary sewer manhole. Payment for manholes will be at the contract unit price, in-place, complete and ready-for-use at the locations shown on plans, in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup, in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused when available and shall be considered incidental to this item. When an existing casting is unavailable or a new casting is specified on plans or elsewhere in the contract, a new casting shall be paid as a separate bid item. Anchoring of a casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. In cases where a manhole is to be located within a grade-sensitive area such as roadway pavement, sidewalks, shared-use-paths, etc., the final casting grade given on plans shall be considered approximate. Any readjustment of a manhole casting to meet field conditions shall be incidental to this item. No additional payment shall be made for casting adjustments on new manholes. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE ABANDON/REMOVE Payment under this item is for the full or partial removal, disposal, and/or filling of any sanitary sewer manhole, regardless of size or depth, that no longer serves any purpose. All manholes partially removed shall be removed to a point at least 12 inches below final grade, 12 inches below roadway subgrade, or 12 inches clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected, the remaining manhole structure shall be filled with flowable fill. Flowable fill shall be considered incidental to this bid item. Plugging of pipes entering and exiting within an abandoned manhole that is left in place partially or in whole shall be considered incidental to this item. All sanitary sewer castings shall be salvaged and securely stockpiled for reuse on new sanitary sewer manholes. Salvage of manhole castings for reuse on the project shall be considered incidental to this

bid item. Any casting that is not needed for reuse, is not reusable, or is directed by the engineer not to be reused shall be disposed of by the contractor. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

Plugging or safeloading of pipes required at locations outside of manholes when manholes are removed in total shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications for Road and Bridge Construction, using Bid code 01314, Plug Pipe.

S MANHOLE ADJUST TO GRADE Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting, but shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE CASTING STANDARD Payment under this item is for the furnishing of a new, standard, traffic-bearing casting for sanitary manholes that meets the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE CASTING WATERTIGHT Payment under this item is for the furnishing of a new, watertight, traffic-bearing casting for sanitary manholes that meets the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE OVERSIZED Payment under this item is for the installation of a new manhole greater than the standard 4-foot interior diameter. Payment for oversized manholes will be made at the contract unit price in-place, complete and ready-for-use at the locations shown on plans, in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup, in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused when available and shall be considered incidental to this item. When an existing casting is unavailable or a new casting is specified on plans or elsewhere in the contract, a new casting shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. In cases where a manhole is to be located within a grade-sensitive area such as roadway pavement, sidewalks, shared-use-paths, etc., the final casting grade given on plans shall be considered approximate. Any readjustment of a manhole casting to meet field conditions shall be incidental to this item. No additional payment shall be made for casting adjustments on new manholes. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE RECONSTRUCT INVERT This item is to pay for all labor, equipment, and material for

the rework of an existing manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot, as required by utility specifications, standard drawings, or plans. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

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

S MANHOLE TAP EXISTING ADD DROP This item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base and one opening in a manhole wall for cleanout, addition of rubber seals as specified, addition of a vertical drop pipe to the outside of the manhole, placement of reinforcing steel and concrete to encase vertical pipe, and rework of the manhole bench to direct the additional pipe flow. This bid item shall be paid for each drop added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, standard drawings, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH DROP Payment under this item is for the installation of new 4-foot interior diameter sanitary sewer manhole with drop. Payment for drop manholes will be made at the contract unit price, in-place, complete and ready-for-use at the locations shown on plans, in accordance with specifications, and standard drawings. Drop manholes shall include concrete base, barrel sections, drop materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting salvaged from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH LINING Payment under this item is for the installation of a new 4-foot interior

diameter sanitary sewer manhole with corrosion-resistant lining. Payment for manholes with lining will be made at the contract unit price, in-place, complete and ready-for-use at the locations shown on plans, in accordance with specifications, and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH TRAP Payment under this item is for the installation of a new manhole with trap. Payment for trap manholes will be made at the contract unit price each, in-place, complete and ready-for-use at the locations shown on plans, in accordance with specifications, and standard drawings. Trap manholes shall include concrete base, manhole structure and trap materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be made for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S PIPE This item description shall apply to all gravity and force-main sewer pipe bid items, of every size and type of material 8 inches internal diameter and larger, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, backfill, restoration, pressure or vacuum testing, temporary testing materials, video inspection, etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings, complete and ready-for-use. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lampholes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

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

This bid item shall include bypass pumping when required. Measurement shall be from contact point to contact point of old and new pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

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

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

Manhole abandonment shall not be paid under this item but shall be paid under the bid item S MANHOLE ABANDON/REMOVE.

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

Manhole removal shall not be paid under this item but shall be paid under the bid item S MANHOLE ABANDON/REMOVE.

SANITARY SEWER RELOCATIONS

SANITATION DISTRICT NO. 1

THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR RELOCATION OF SANITATION DISTRICT NO. 1 FACILITIES ONLY.

SECTION 02220

EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling and grading, and disposing of earth materials as shown, specified, and required for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities required to complete the Work in every respect.
2. All necessary preparation of subgrade for slabs and pavements is included.
3. All temporary means needed to prevent discharge of sediment to water courses from dewatering systems or erosion are included.
4. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof.

B. Related Sections:
1. Section 02050, Demolitions.
2. Section 02512, Bituminous Paving.
3. Section 02900, Landscaping.
4. Section 15051, Buried Piping Installation.

1.2 QUALITY ASSURANCE

A. Tests:
1. Engage the services of a qualified testing laboratory to make tests and determine acceptability of the fill or material as listed below. Laboratory shall be acceptable to ENGINEER.
2. Field quality control testing will be performed by SD1's testing service. CONTRACTOR shall give full cooperation to SD1's testing personnel so that the required tests can be taken in an efficient and timely manner.
3. Required Tests:
    a. Select Fill Samples: Gradation, ASTM D 422.
    b. General Fill Samples: Gradation, ASTM D 422; Atterberg Limits, ASTM D4318
    c. Compacted General Fill: Compaction, ASTM D 1556 and ASTM D 698, ASTM D 2922.
    d. Compacted Select Fill, Drainage Fill, Subbase Material and Pipe Bedding: Compaction, ASTM D 1556 and ASTM D 698, ASTM D 2922, ASTM D4253, ASTM D4254.

B. Permits and Regulations:
1. SD1 will obtain all necessary permits for work in roads, rightsofway, railroads, etc.
2. CONTRACTOR shall obtain permits as required by local, state and federal agencies for discharging water from excavations.
3. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

C. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
1. ASTM A 36, Specification for Structural Steel.
2. ASTM A 328, Specification for Steel Sheet Piling.
3. ASTM D 422, Method for ParticleSize Analysis of Soils.
4. ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft – lbf/cu ft) (600 KN-m/cum).
5. ASTM D 1556, Test Method for Density and Unit Weight of Soil in Place by the SandCone Method.
6. ASTM D 2321, Practice for Underground Installation of Thermoplastic Pipe for Sewer and other Gravity – Flow Applications
7. ASTM D 2922, In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
8. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
9. ASTM D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
10. AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.
11. Kentucky Department of Highways (KDOH), Standard Specifications for Road and Bridge Construction, 2000 Edition.
12. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. Excavation Plan: Prior to start of excavation operations, submit written plan to demonstrate compliance with OSHA Standard 29 CFR Part 1926.650. As a minimum, excavation plan shall include:
1. Name of competent person.
2. Excavation method(s) or protective system(s) to be used.
3. Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.

B. Shop Drawings: Submit for approval the following:
1. Sheeting and bracing, or other protective system(s).
2. Dewatering system.
3. Cofferdams.
4. Anticipated Protection Methods.

5. Underpinning.

Shop Drawings shall be prepared by a licensed professional engineer recognized as expert in the specialty involved. Also submit for approval, calculations and all other pertinent information. CONTRACTOR, however, will be responsible for designing, installing, operating and maintaining the system(s) as required to satisfactorily accomplish all necessary sheeting, bracing, protection, underpinning and dewatering.

C. Submit gradation and compaction test reports of all specified soil materials.

1.4 JOB CONDITIONS

A. Subsurface Information: Refer to Supplementary Conditions for Data on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured. SD1 will not be responsible for interpretations or conclusions drawn therefrom by CONTRACTOR. Data are solely made available for the convenience of CONTRACTOR.
   1. Additional test borings and other exploratory operations may be made by CONTRACTOR at no cost to SD1.

B. Existing Structures: The Drawings show certain surface and underground structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of CONTRACTOR. CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by CONTRACTOR. If they are broken or damaged, they shall be restored immediately by CONTRACTOR at his expense.

C. Existing Utilities: Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during all operations.
   1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult piping or utility owner and ENGINEER immediately for directions as to procedure. Cooperate with SD1 and utility owner in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
   2. In general, service lines to individual houses and businesses are not shown; however, CONTRACTOR shall assume that a service exists for each utility to each house or business.
   3. Do not interrupt existing utilities serving facilities occupied and used by SD1 or others, except when permitted in writing by ENGINEER and then only after acceptable temporary utility services have been provided.
   4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

D. Protection of Persons and Property: Barricade open excavations occurring as part of the Work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
   1. 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: Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways, to minimize creation and dispersion of dust. Calcium chloride may be used to control serious or prolonged dust problems, subject to approval of ENGINEER.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Select Fill:
   1. Place select fill where shown or specified below and around structures, pipelines, roads, tanks, walks, and other work.
   2. Use well graded sand and gravel, free from organic matter. A well-graded select fill shall have a uniformity coefficient greater than 6 for sand and greater than 4 for gravel and have a coefficient of gradation between 1 and 3 for sand and gravel. Not more than 70 percent by weight shall pass through a No. 40 sieve; not more than 10 percent by weight shall pass through a No. 200 sieve; and 100 percent shall pass
   3. Advise ENGINEER in writing of source and, if required, submit a sample of the material for approval.

B. Subbase Material:
   1. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand, approved by ENGINEER.
   2. Comply with the gradation conforming to Crushed Stone Base in KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.

C. Drainage Fill: Gradation shall conform to the requirements for Free Draining Bedding and Backfill in KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.

D. General Backfill and Fill Materials: Provide approved soil materials for backfill and fill, free of rock thicker than 6 inches or larger than 24 inches maximum in any dimension, debris, waste, frozen materials, vegetable and other organic matter and other deleterious materials. Previously excavated materials meeting these requirements may be used for backfill. All rock shall be excluded from fill within 24 inches of the pipe.

E. Riprap: Provide rock, broken concrete (if no reinforcing steel is present), or stone of sizes such that at least 85% of the total material by weight is larger than a 6-inch but less than an 18-inch square opening. At least 50% of the total material by weight shall be

larger than a 12-inch square opening. The material smaller than a 6-inch square opening shall consist predominantly of rock and shall be free of soil.

F. Pipe Bedding Material:
   1. Place around pipe and compact for pipe bedding material.
   2. Fill shall be clean natural or washed sand and gravel, crushed gravel or crushed stone, free from bituminous or cementitious substances and flat or flaky particles in an amount to cause caking, packing, yielding or uneven support for the pipe. Lime sand shall not be acceptable. All material shall be of such sizes that one-hundred percent (100%) passes the one and one half (1 ½) inch screen, 40% or less passes the No. 40 sieve, and ten (10) percent or less passes the No. 200 sieve.
   3. Fill shall not consist of any organic soil or stone larger than 1½-inch in any dimension.

G. Control Density Fill:
   1. Use for trench backfill where shown on the Drawings.
   2. Description:
      a. Flowable fill shall consist of a mixture of cement, sand, fly ash, water and other materials approved by SD1.
   3. Materials and Mixing Proportioning:
      a. Cement: 30 lbs.
      b. Fly Ash, Class F: 300 lbs. Do not allow the loss or ignition for Class F fly ash to exceed twelve (12) percent.
      c. Natural Sand (S.S.D): 3,000 lbs.
      d. Water (Maximum): 550 lbs. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
   4. Properties:
      a. Average Compressive Strength:
         1) 28 days: 50 to 100 psi
      b. For applications that require early opening to traffic or placement of pavement as soon as possible, provide a mixture with the following properties:
         1) Mixture bleeds freely within 10 minutes
         2) Mixture shall support a 150-pound person within three (3) hours.

H. Flash Fill:
   1. Use for trench backfill where shown on the Drawings.
   2. Description:
      a. Be readily flowable to form around pipes, cables and other embedments in trenches.
      b. Achieve a quick initial set to permit paving within 4 hours of placement.
      c. Achieve an initial strength capable of bearing traffic within 4 hours of placement.
      d. Achieve an ultimate strength of no more than 100 psi so that material can be re-excavated if necessary.

3. Materials:
    a. Cement: None.
    b. Fly ash shall meet ASTM C-618, Class C or Class F, except that requirement for moisture and pozzolanic activity are waived for Class F fly ash.
    c. Sand shall be natural, recycled, or manufactured. Other filler materials may be used as a substitute with approval.
    d. Water used for the mixture shall be potable and free of oil, salts, acid and other impurities that would have an adverse effect on the quality of the backfill material.
4. Properties:
    a. Resistance to Penetration (avg. at 4 hours): 400 psi.
    b. Coefficient of Permeability: $2.6x10^{-5}$ cm/sec.
    c. Unconfined Compressive Strength:
        1) 3 Hours: 20 psi (1.44 tsf).
        2) 28 Days: 70 psi (5.0 tsf).
        3) 91 Days: 100 psi (7.2 tsf).
    d. Atterberg Limits: Non plastic.
    e. pH (at one month): 11.16.
    f. Thermal Resistivity: 45 C-cm/w.
    g. Color: Tan.
5. Mixing Proportioning:
    a. ASTM C-618 Fly Ash: 400 lbs.
    b. Sand: 2930 lbs.
    c. Water: 430 lbs.
    d. Unit Weight (Fresh Weight): 135 lbs/cu. ft.
6. Product Name:
    a. Flashfill by Roth Ready Mix Concrete Co.
    b. Or equal.

PART 3 EXECUTION

3.1 INSPECTION

A. CONTRACTOR shall examine installation site, verify elevations, and observe conditions under which work is to be performed and notify ENGINEER of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

B. Provide ENGINEER with sufficient notice and with means to examine the areas and conditions under which excavating, filling, and grading are to be performed. ENGINEER will notify CONTRACTOR if conditions are found that may be detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 SITE PREPARATION

A. Clear all areas to be occupied by permanent construction or embankments of all trees, brush, roots, stumps, logs, wood and other materials and debris. Clean and strip subgrades for fills and embankments of vegetation, sod, topsoil and organic matter. All waste materials shall be removed from site and properly disposed of by CONTRACTOR. Burning will not be permitted.

3.3 TEST PITS

A. Where shown or ordered by ENGINEER, excavate and backfill, in advance of construction, test pits to determine conditions or location of existing facilities. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, backfilling and replacing pavement for the test pits.

B. Payment for test pits ordered by ENGINEER not included in section 0300 will be paid for under a change order per Article 10 of the General Conditions.

C. No separate payment will be made for test pits made by CONTRACTOR for his own use.

3.4 EXCAVATION

A. Perform all excavation required to complete the Work as shown, specified and required. Excavations shall include earth, sand, clay, gravel, hardpan, boulders, bedrock, pavements, rubbish and all other materials within the excavation limits.

B. Refer to Section 02222 for Rock Removal.

C. Excavations for structures and pipelines shall be open excavations. Provide excavation protection system(s) required by ordinances, codes, law and regulations to prevent injury to workmen and to prevent damage to new and existing structures or pipelines. Unless shown or specified otherwise, protection system(s) shall be utilized under the following conditions.
   1. Excavation Less Than 5 Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
   2. Excavations More Than 5 Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded or shored and braced.
   3. Excavation protection system(s) shall be installed and maintained in accordance with drawings submitted under Article 1.3 above.

D. Where the structure or pipeline is to be placed below the ground water table, well points, cofferdams or other acceptable methods shall be used to permit construction of said structure or pipeline under dry conditions. Dry conditions shall prevail until concrete has

reached sufficient strength to withstand earth and hydrostatic loads and until the pipelines are properly jointed, and backfilled. In addition, protect excavation from flooding until all walls and floor framing up to and including grade level floors are in place and backfilling has begun. Water level shall be maintained below top of backfill at all times.

E. Pumping of water from excavations shall be done in such a manner to prevent the carrying away of unsolidified concrete materials, and to prevent damage to the existing subgrade. See also additional requirements in section 15051 BURIED PIPING INSTALLATION.

F. The elevation of the bottom of footings shown shall be considered as approximate only and ENGINEER may order such changes in dimensions and elevations as may be required to secure a satisfactory footing. All structure excavations shall be hand-trimmed to permit the placing of full widths, and lengths of footings on horizontal beds. Rounded and undercut edges will not be permitted.

G. When excavations are made below the required grades, without the written order of ENGINEER, they shall be backfilled with compacted gravel or concrete, as directed by ENGINEER, at the expense of CONTRACTOR.

H. Excavations shall be extended sufficiently on each side of structures, footings, etc., to permit setting of forms, installation of shoring or bracing or the safe sloping of banks.

I. Subgrades:
   1. General Requirements: The backfill shall be maintained at ±3% from optimum moisture content. The compacted fill shall remain firm and intact under all construction operations. Mud, muck, and other soft or unsuitable materials shall be removed.
   2. Subgrade Requirements for Roadways: Compact to the degree specified in the KYTC Standard Specifications for Road and Bridge Construction, Latest Edition.
   3. Subgrade Requirements for Pipeline Trench Bottoms, Floor Slabs and Concrete Pads: Compact to at least 95% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698.
   4. Subgrade Requirements for Footing Foundations: Compact to at least 98% of the maximum Standard Proctor dry unit weight as determined by ASTM D 698 (unless otherwise noted).
   5. Soft Subgrades: For subgrades which are otherwise solid, but which become soft or unsuitable on top due to construction operations, remove the soft and unsuitable material and replace with suitable backfill and recompact to the specified density.
   6. Finished Elevation of Stabilized Subgrades: Do not place above subgrade elevations shown.

J. Stability of Excavations:
   1. Sides of Excavations: Slope to comply with codes and ordinances of agencies having jurisdiction.

2. Shoring and Bracing: Provide shoring and bracing where sloping is not possible either because of space restrictions or stability of material excavated.
3. Safety: Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
4. Caving: If caving occurs outside the excavation area, backfill the resulting hole in accordance with the requirements of this section after removing loose material.

K. Pipe Trench Preparation: Trench construction shall be per SD1 pipe bedding and trench condition details as follows
1. No more than 200 feet of trench may be opened in advance of pipe laying.
2. Trench width shall be minimized to greatest extent practical but shall conform to SD1's standard trench details and the following:
    a. Flexible Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus two feet for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be the OD of the pipe plus four feet.
    b. Rigid Pipe: Sufficient to provide room for installing, jointing and inspecting piping, but a minimum of pipe barrel OD plus two feet for 36" and less diameter pipe. For pipe that is greater than 36" in diameter, the trench width shall be: **OD + 2*(OD/6).**
    c. Enlargements at pipe joints may be made if required and approved by ENGINEER.
    d. Sufficient for shoring and bracing, or shielding and dewatering.
    e. Sufficient to allow thorough compaction of bedding material adjacent to bottom half of pipe.
    f. Do not use excavating or compaction equipment, which requires the trench to be excavated to excessive width.
3. Depth of trench shall be as shown. If required and approved by ENGINEER, depths may be revised.
4. Bedding material shall be carefully placed over the full trench width before the pipe is laid to a depth of at least 6-inches and compacted in maximum of 6-inch lifts over the full trench width. Where pipe is laid in rock excavation, depth of pipe bedding below the pipe shall be at least 6-inches for pipe 24-in. and smaller and 9-inches for pipe 30-in. and larger. After laying pipe, the balance of the bedding material and backfill shall be placed as described herein.

L. Material Storage: Stockpile satisfactory excavated materials in approved areas, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
1. Locate and retain soil materials away from edge of excavations.
2. Dispose of excess soil material and waste materials as specified hereinafter.

M. Where ENGINEER considers the existing material beneath the bedding material unsuitable, CONTRACTOR shall remove same and replace it with compacted select fill or compacted pipe bedding material.

3.5 UNAUTHORIZED EXCAVATION

A. All excavation outside the lines and grades shown, and which is not approved by ENGINEER, together with the removal and disposal of the associated material shall be at CONTRACTOR'S expense. Unauthorized excavations shall be filled and compacted with select backfill by CONTRACTOR at his expense.

3.6 AUTHORIZED UNDERCUTS

A. Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.

B. If in the course of excavation as determined by the ENGINEER, unstable soil is encountered at the point of the bottom of the required excavation, the CONTRACTOR shall be authorized to undercut sufficiently to remove all the unstable soil to the limits specified by the ENGINEER.

C. The CONTRACTOR shall refill the undercuts with select backfill or pipe bedding material and compact same to the requirements set forth in paragraph 3.4.I, unless other means of refill are specified or ordered by the ENGINEER.

D. The cost of removing and disposing of the unstable material and providing refill material shall be reimbursable to the CONTRACTOR at the contract unit price bid or at a mutually agreeable negotiated unit price between the CONTRACTOR and SD1

3.7 DRAINAGE AND DEWATERING

A. General:
   1. Prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.
   2. Remove water from excavation as fast as it collects.
   3. Maintain the ground water level below the bottom of the excavation to provide a stable surface for construction operations, a stable subgrade for the permanent work, and to prevent damage to the Work during all stages of construction.
   4. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
   5. Obtain ENGINEER'S approval before shutting down dewatering system for any reason.

B. Standby Requirements for Dewatering: Provide standby equipment to ensure continuity of dewatering operations.

C. Disposal of Water Removed by Dewatering System:

1. All dewatering flows are to be settled in siltation basins or directed through filtering devices before discharge to stabilized sites, such as streams or sewers; not onto exposed soils, stream banks, or any other site where the flow could cause erosion.
2. Silt from construction operations shall not be permitted to enter the storm sewer system. When construction occurs near storm sewer inlets, erosion control measures such as inlet filters and hay bales shall be used to prevent silt from entering storm sewers.
3. Dispose of all water removed from the excavation in such a manner as not to endanger public health, property, or any portion of the Work under construction or completed.
4. Dispose of water in such a manner as to cause no inconvenience to SD1, ENGINEER, or others involved in work about the site.
5. Convey water from the construction site in a closed conduit. Do not use trench excavations as temporary drainage ditches.
6. CONTRACTOR shall be responsible for complying with all regulatory agency rules pertaining to dewatering and obtaining permits, if required.
7. See also additional requirements in section 15051 BURIED PIPING INSTALLATION.

3.8 SHEETING, SHORING AND BRACING

A. General:
1. Used material shall be in good condition, not damaged or excessively pitted. All steel or wood sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary work.
2. All timber used for breast boards (lagging) shall be new or used, meeting the requirements for Douglas Fir Dense Construction grade with a bending strength not less than 1500 psi or Southern Pine No. 2 Dense.
3. All steel work for sheeting, shoring, bracing, cofferdams etc., shall be designed in accordance with the provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", of the AISC except that field welding will be permitted.
4. Steel sheet piling shall be manufactured from steel conforming to ASTM A 328. Steel for soldier piles, wales and braces shall be new or used and shall conform to ASTM A 36.
5. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
6. Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed when work is completed. Such removal shall be made in a manner not injurious to the structure or its appearance or to adjacent Work.
7. Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cutoff tops as required and leave permanently in place.
8. The clearances and types of the temporary structures, insofar as they affect the character of the finished Work, and the design of sheeting to be left in place, will be

subject to the approval of ENGINEER; but CONTRACTOR shall be responsible for the adequacy of all sheeting, shoring, bracing, coffer-damming, etc.

9. Safe and satisfactory sheeting, shoring and bracing shall be the entire responsibility of CONTRACTOR.

B. Sheeting Left in Place:
   1. Steel sheet piling shown to be left in place shall consist of rolled sections of the continuous interlocking type unless otherwise approved. The type and design of the sheeting and bracing shall conform to the above specifications for all steel work for sheeting and bracing. Steel sheeting designated to be left in place shall be new.
   2. Steel sheet piling to be left in place shall be driven straight to the lines and grades as shown or directed. The CONTRACTOR shall determine the grade to which the sheet piling shall be driven. The piles shall penetrate into firm materials with secure interlocking throughout the entire length of the pile. Damaged piling having faulty alignment shall be pulled and replaced by new piling.
   3. The type of guide structure used and method of driving for steel sheet piling to be left in place shall be subject to the approval of ENGINEER. Jetting will not be permitted.
   4. Cut off piling left in place to the grades shown or ordered by ENGINEER and remove the cut offs from the site.
   5. Clean wales, braces and all other items to be embedded in the permanent structure, and ensure that the concrete surrounding the embedded element is sound and free from air pockets or harmful inclusions. Provisions shall include the cutting of holes in the webs and flanges of wale and bracing members, and the welding of steel diaphragm waterstops perpendicular to the centerline of brace ends which are to be embedded.
   6. Subsequent to removal of the inside face forms, and when removal of bracing is permitted, cut back steel at least 2 inches inside the wall face and patch opening with cement mortar. Concrete shall be thoroughly worked beneath wales and braces, around stiffeners and in any other place where voids may be formed.
   7. Portions of sheeting or soldier piles and breast boards which are in contact with the foundation concrete shall be left in place, together with wales and bracing members which are cast into foundation or superstructure concrete.

C. Removal of Sheeting and Bracing:
   1. Remove sheeting and bracing from excavations unless otherwise ordered in writing by ENGINEER. Removal shall be done so as to not cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structure.
   2. Defer removal of sheeting and bracing, where removal may cause soil to come into contact with concrete, until the following conditions are satisfied:
      a. Concrete has cured a minimum of 7 days.
      b. Wall and floor framing up to and including grade level floors are in place.

3.9 TRENCH SHIELDS

A. Excavation of earth material below the bottom of a shield shall not exceed the limits established by ordinances, codes, laws and regulations.

B. When using a shield for pipe installation:
   1. Any portion of the shield that extends below the mid-diameter of an installed rigid pipe (i.e. RCCP) shall be raised above this point prior to moving the shield ahead for the installation of the next length of pipe.
   2. The bottom of the shield shall not extend below the mid-diameter of installed flexible pipe (i.e. Steel, DI, PVC, etc.) at any time and shall be raised above this point prior to moving the shield ahead for the installation of the next length of pipe.

C. When using a shield for the installation of structures, the bottom of the shield shall not extend below the top of the bedding for the structures.

D. When a shield is removed or moved ahead, extreme care shall be taken to prevent the movement of pipe or structures or the disturbance of the compacted bedding for pipe or structures. Pipe or structures that are disturbed shall be removed and reinstalled as specified.

3.10 GENERAL REQUIREMENTS FOR BEDDING, BACKFILL, FILL AND COMPACTION

A. Furnish, place and compact all fill and backfill required for structures and trenches and to provide the finished grades shown and specified, including but not limited to restoration of access roads, construction benches, etc. Unless otherwise specified, backfill and fill may be obtained from onsite sources. Additional materials, if required, shall be furnished from offsite sources at no additional cost to SD1.

B. Backfill excavations as promptly as Work permits, but not until completion of the following:
   1. Acceptance by ENGINEER of construction below finish grade including dampproofing, waterproofing, perimeter insulation, trench construction, and pipe and bedding installation.
   2. Inspection, testing, approval, and recording of locations of underground utilities.
   3. Removal of concrete formwork.
   4. Removal of shoring and bracing.
   5. Removal of trash and debris.
   6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
   7. Placement of settlement plates.

C. Keep excavations dry during backfilling operations. Bring backfill around structures and piping up evenly on all sides.

D. Do not allow levels of backfill against concrete walls to differ by more than 2 feet on either side of walls unless walls are adequately braced or all floor framing is in place up to and including grade level slabs.

E. Place select backfill material above pipe encasements and as bedding material for pipelines that pass under structures, concrete pavements, or other pipelines. General backfill material may be used above pipe bedding material in other areas. Method of bedding pipe shall be as specified in Section 02610 and as shown on the Drawings.

F. Place all bedding in pipe trenches in horizontal layers not exceeding 6 inches in depth up to a point 12-inches or more above the top of the pipe and thoroughly compact each layer along the full trench width before the next layer is placed.

G. Prior to the installation of pipes which are to be installed in fill sections, place the fill as described herein, until a minimum height of 2 feet above the pipe is reached, unless otherwise required in other Sections. The fill for the trench width shall then be excavated and the pipe installed, bedded, and backfilled. The remainder of the fill shall then be placed.

H. Control the water content of backfill and fill material during placement within the range necessary to obtain the compaction specified. In general, the moisture content of the fill shall be within 3 percent of the optimum moisture content for compaction as determined by laboratory tests. Perform all necessary work to adjust the water content of the material to within the range necessary to permit the compaction specified. Do not place backfill or fill material when free water is standing on the surface of the area where the backfill or fill is to be placed. No compaction of backfill or fill will be permitted with free water on any portion of the material to be compacted.

I. Do not place or compact backfill or fill in a frozen condition or on top of frozen material. Remove backfill or fill containing organic materials or other unacceptable material and replace with approved backfill material.

J. Perform Compaction of bedding, backfill and fill with equipment suitable for the type of material placed and which is capable of providing the densities required. CONTRACTOR shall select compaction equipment and submit it and his proposed procedure to ENGINEER for approval.

K. Compacted bedding, backfill, and fill shall be compacted by at least two coverages of all portions of the surface of each lift by compaction equipment. One coverage is defined as the condition obtained when all portions of the surface of the material have been subjected to the direct contact of the compactor.

L. Test the effectiveness of the equipment selected by CONTRACTOR at the commencement of compaction by construction of a small section of trench, backfill or fill within the area where material is to be placed. If tests on this section show that the specified compaction is not obtained, CONTRACTOR shall increase the number of

coverages, decrease the lift thicknesses or obtain a different type of compactor. No additional cost to SD1 shall be incurred.

M. Perform backfill around structures using the specified procedures, except that within 10 feet of foundations and underground structures, light compaction equipment shall be used, with the gross weight of the equipment not exceeding 7,000 pounds. Provide equipment that is capable of the required compaction within restricted areas next to structures and around piping.

3.11 PIPE BEDDING

A. Bedding Pipe: Bed pipe as specified below. Piping refers to the main line pipe as well as any service laterals or connections to the mainline pipe.
   1. Trench excavation, backfill, bedding materials and compaction shall conform to the requirements of this section 02220.
   2. Excavate trenches below the pipe bottom by the amount specified below.
   3. Remove all loose and unsuitable material from the trench bottom in accordance with 3.6, Authorized Undercuts.
   4. Use pipe bedding material as specified in 2.1.F.
   5. Where pipe is installed in a trench excavation, pipe bedding shall be carefully placed and compacted over the full trench width before the pipe is laid. Depth of pipe bedding below the pipe shall be at least 6 inches for pipe 24-in. and smaller and 9 inches for pipe 30-in. and larger. After laying pipe, the balance of the bedding shall be placed as described herein.
   6. Carefully and thoroughly compact all pipe bedding with equipment that achieves the degree of compaction specified in 3.14, Compaction Specifications.
   7. Excavate for bell holes in bedding carefully so as not to disturb the surrounding compacted material and lay pipe so that the bell bears uniformly on the compacted trench bedding material beneath the pipe.
   8. If ENGINEER or SD1 witness bedding not being installed correctly, ENGINEER or SD1 may require approval of the bedding condition prior to laying the pipe. If a conflict exists obtain clarification from ENGINEER before proceeding.
   9. Continue placement of bedding material around pipe. Place all bedding and backfilling in pipe trenches in horizontal layers not exceeding 6 inches in depth and thoroughly compact each layer before the next layer is placed. Bedding material shall be sliced or worked-in along the length of the pipeline during each 6-inch layer lift and then compacted.
   10. No pipe shall be brought into position until the preceding length has been bedded and secured in its final position.
   11. Bedding and initial backfill continues to 12 inches above the top of the pipe.
   12. See Sewer Trench Compaction Detail that follows this section.

3.11.1 Normal Backfill

A. After the pipe sections have been embedded up to a point 12-inches or more above the top of the pipe, the pipe sections have been encased in concrete, or the structures or

appurtenances have been constructed, as specified on the drawings, the remainder of the trench or excavated area shall be backfilled using trench or structure excavated material if it meets the requirements set forth under 2.1.D. General Backfill and Fill Materials. If the material does not meet these requirements, the trench or structure excavated material shall be wasted and suitable imported material shall be used for backfill.

B. Backfill shall be placed in horizontal loose lifts not exceeding 8 inches in thickness and shall be mixed and spread in a manner assuring uniform lift thickness after placing. Backfill shall then be compacted as specified under 3.11 Compaction Specifications up to existing ground level or finished grade level if same has been established.

3.11.2 Rock Backfill

A. Where the trench is located in areas from which rock had to be excavated in a quantity other than isolated stones, the excavated rock may be used as part of the backfill above a point 2 feet or more above the top of the pipe, or above a point 1 foot above pipe encasement, but shall not be used under pavement areas, unless specifically authorized by the ENGINEER.

B. The rock fragments used in the backfill shall not exceed rock thicker than 6 inches or larger than 24 inches maximum in any dimension, shall not be dropped into the trench directly over the pipe centerline and shall be used with sufficient smaller dimensioned material so that voids between larger fragments shall be filled. Compaction shall meet the requirements specified under 3.11 Compaction Specifications up to existing ground level or finished grade level if same has been established.

C. Rock shall not be used in the top 12-inches of the backfill, except across creeks, gullies, ravines or areas designated by the ENGINEER, where the rock may be used to the existing ground level as specified on the drawings.

3.12 COMPACTION SPECIFICATIONS

A. Requirements based on material types are as follows:

1. Select Fill, Drainage Fill and Pipe Bedding: For fill and bedding beneath structures and foundations, compact granular materials that exhibit a well-defined moisture density curve to at least 98 percent of the standard proctor maximum dry density (ASTM D698). For all other fill and bedding, compact granular materials that exhibit a well-defined moisture–density curve to at least 95 percent (ASTM D698). Moisture-condition fill materials to within a range of two (2) percent below to three (3) percent above optimum moisture content (ASTM D698). Compact granular materials that do not exhibit a well-defined moisture-density curve to at least 85 percent relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75 percent relative density (ASTM D4253 and D4254) for all other areas.

2. Subbase Material: Compact granular materials that exhibit a well-defined moisture-density curve to at least 100 percent (ASTM D698). Moisture-condition subbase material to within one (1) percent of optimum moisture contents (ASTM D698). Compact granular materials that do not exhibit a well-defined moisture density curve to at least 85 percent relative density (ASTM D4253 and D4254).

3. General Fill and Backfill: Compact materials that exhibit a well-defined moisture density curve to at least 98 percent of the standard proctor maximum dry density (ASTM D698) beneath structures, foundations and the top one (1) foot below pavements, and at least 95 percent (ASTM D698) in all other areas. Moisture-condition fill materials to within a range of two (2) percent below to three(3) percent above optimum moisture content (ASTM D698). Compact granular or rock materials that do not exhibit a well-defined moisture-density curve to at least 85 percent relative density (ASTM D4253 and D4254) beneath structures and foundations, and to at least 75 percent relative density (ASTM D4253 and D4254) for all other areas.

B. If the specified densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly functioning compaction equipment, or because of soil moisture content, the CONTRACTOR shall perform whatever work is required to provide the required densities. This work shall include complete removal of unacceptable bedding, backfill or fill areas, and replacement and recompaction until acceptable densities are provided.

C. CONTRACTOR shall repair, at his own expense, any Settlement that occurs within the construction area. He shall make all repairs and replacements necessary within 30 days after notice from ENGINEER or SD1.

3.13 EMBANKMENTS

A. To the maximum extent available, use excess earth obtained from structure bench and trench excavations for construction of embankments. Obtain additional material from borrow pits as necessary. After preparation of the embankment area, level and roll the subgrade so that surface materials of the subgrade will be compact and well bonded with the first layer of the embankment. All material deposited in embankments shall be free from rocks or stones, more than 6 inches thick or larger than 24 inches in maximum dimension, brush, stumps, logs, roots, debris, and organic or other objectionable

materials. Construct embankments in horizontal layers not exceeding 8 inches in uncompacted thickness. Spread and level material deposited by excavating and hauling equipment prior to compaction. Thoroughly compact each layer by rolling or other method acceptable to the ENGINEER to at least 98 percent of the maximum density within two (2) to three (3) percent of optimum moisture content as determined by ASTM D 698 beneath structures and foundations, and 95 percent (ASTM D698) in all other areas. If the material fails to meet the density specified, compaction methods shall be altered. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed and compacted to an elevation 24 inches above the top of the pipe before the trench is excavated.

3.14 STRUCTURE FILL

A. Provide structure fill in the following locations:
   1. Support for structure foundations where CONTRACTOR excavates below design subgrade shall be provided at CONTRACTOR'S expense.
   2. Support below and around piping and foundations as directed by ENGINEER.
   3. Subgrade for roads and pavements.
   4. Restoration of construction benches and access roads.
   5. Where shown or directed by ENGINEER.

B. Subgrade surface shall be level, dry, firm and subject to ENGINEER'S approval. Do not place fill if any water is on the surface of area to receive fill. Do not place or compact fill in a frozen condition or on top of frozen material.

C. Place fill in horizontal loose lifts of 8 inches maximum thickness. It shall be mixed and spread in a manner to assure uniform lift thickness after placing.

D. Compact each layer of fill before placement of the next lift.

E. Do not use fill containing topsoil, rubble, debris, wood or other organic matter. Fill containing unacceptable material shall be removed and disposed of.

F. The water content of the fill being compacted shall be within the range of two (2) percent below to three (3) percent above the optimum moisture content of the material. CONTRACTOR shall wet or dry the fill materials during placement to achieve water contents needed for effective compaction.

G. Perform compaction of fill with equipment suitable for the type of fill material being placed. Select equipment, which is capable of providing the densities, required and submit selection of the equipment to ENGINEER for approval.

H. Compact each layer of fill material by at least two complete coverages of all portions of the surface of each lift using approved compaction equipment. One coverage is defined as the condition reached when all portions of the fill lift have been subjected to the direct contact of the compacting surface of the compactor.

I. The minimum density to be obtained in compacting the structural fill shall be 98 percent of the standard Proctor maximum dry density (ASTM D698) beneath structures and foundations, and 95 percent (ASTM D698) in all other areas. If the field and laboratory tests indicate unsatisfactory compaction, CONTRACTOR shall provide the additional compaction necessary to obtain the specified degree of compaction. All additional compaction work shall be performed by CONTRACTOR at no additional cost to SD1 until the specified compaction is obtained.

J. Structure fill necessary to replace subgrade materials disturbed and softened as a result of CONTRACTOR'S operations or to backfill unauthorized excavation shall be provided, placed and compacted at CONTRACTOR'S expense.

3.15 GRADING

A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
   1. Turfed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive topsoil or special cover to within not more than 1 inch above or below the required subgrade elevations.
   2. Walks: Shape surface of areas under walks to line, grade and crosssection, with finish surface not more than 1 inch above or below the required subgrade elevation.
   3. Pavements: Shape surface of areas under pavement to line, grade and crosssection, with finish surface not more than 1/2 inch above or below the required subgrade elevation.

C. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10 foot straightedge.

D. Compaction:
   1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.16 PAVEMENT SUBBASE COURSE

A. General: Place subbase material, in layers of specified thickness, over ground surface to support pavement base course.
   1. See other Sections of Division 2 for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and crossslope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
   1. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.17 DISPOSAL OF EXCAVATED MATERIALS

A. Material removed from the excavations which does not conform to the requirements for fill or is in excess of that required for backfill shall be hauled away from the project site by the CONTRACTOR and disposed of in compliance with ordinances, codes, laws and regulations at no additional cost to SD1.

3.18 RESTORING AND RESURFACING EXISTING ROADWAYS AND FACILITIES

A. Restore pavement per roadway trench detail. . Maintain the surface of the paved area over the trench in good and safe condition during progress of the entire Work, and promptly fill all depressions over and adjacent to the trench caused by settlement of backfilling. The permanent replacement pavement shall be equal to that of the existing roadways unless otherwise specified.

B. Pavement, gutters, curbs, sidewalks or roadways disturbed or damaged by the CONTRACTOR'S operations shall be restored by him at his own expense to as good condition as they were previous to the commencement of the Work and in accordance with applicable local and state highway specifications.

3.19 TEMPORARY FENCING

A. Furnish and install a temporary fence surrounding excavations and work area. Fence shall have openings only at vehicular, equipment and worker access points.

B. The fence shall be a snow fence type enclosure, 48 inches high. Fence shall be constructed of vertical hardwood slats measuring 11/2 by 1/4inch interwoven with strands of horizontal wire, or shall be of equivalent plastic construction. Posts shall be of steel, either U, Y, T or channel section, and shall have corrugations, knobs, notches or studs placed and constructed to engage a substantial number of fence line wire in the

proper position. Posts shall have tapered anchors weighing 0.67 pounds or more, each firmly attached by means of welding, riveting or clamping. Posts shall have a nominal weight of 1/3 pound per linear foot exclusive of the anchor. Each post shall be furnished with a sufficient number of galvanized wire fasteners or clamps, of not less than 0.120inch in diameter for attaching fence wire to the post.

3.20 ENVIRONMENTAL PROTECTION AND RESTORATION

A. CONTRACTOR shall be responsible for complying with all regulatory requirements pertaining to environmental protection and restoration. CONTRACTOR shall follow all erosion control design provisions shown in the Erosion Prevention and Sediment Control Plan, drawings, and specifications. CONTRACTOR shall provide, install, and maintain additional erosion and sediment control measures as necessary to retain disturbed sediments on-site.

B. All disturbed areas of the site shall be stabilized. Stabilization shall begin within 7 days on areas of the site where construction activities have permanently or temporarily (for 30 days or more) ceased. When snow cover causes delays, stabilization shall begin as soon as possible. Stabilization practices include seeding, mulching, placing sod, planting trees or shrubs, and using geotextile fabrics and other appropriate measures.

3.21 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: SD1's testing service must inspect and approve subgrades and fill layers before construction work is performed thereon. Tests of subgrades and fill layers shall be taken as follows:
   1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to ENGINEER.
   2. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2000 square feet of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 square feet of overlaying building slab or paved area, but in no case less than 3 tests.
   3. Compacted bedding material beneath and around pipe in trenches: Make at least one field density test of compacted bedding at the start of the project to ensure CONTRACTOR's method of compacting the bedding is meeting the compaction requirements. SD1 shall periodically call for tests of bedding compaction as the Work progresses and if the CONTRACTOR's pipe placement operations differ from proper procedures.

B. If testing service reports or inspections show subgrade, fills, or bedding compaction are below specified density, CONTRACTOR shall remove any unacceptable materials as necessary and replace with specified materials and provide additional compaction at the CONTRACTOR's sole expense until subgrades, bedding, and backfill are acceptable as specified herein. The costs for the retesting of these subgrade, fills, or bedding materials that did not originally meet the specified density shall be paid by the CONTRACTOR.

+ + END OF SECTION + +

SECTION 02606

SANITARY & STORM STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all sanitary and storm structures including but not limited to precast and cast-in-place manholes, air release manholes, bypass pumping vaults, drainage structures, headwalls, outfalls, etc.

1.2 RELATED WORK

A. Division 2, Sections on Earthwork

B. Section 03300, Cast-In-Place Concrete

D. Section 05501, Miscellaneous Metal Fabrications

E. Section 05536, Floor Access Hatch Covers

F. Section 05540, Castings

G. Division 15, Sections on Piping

H. Section 02607, Sanitary Structure Lining System

1.3 REFERENCES

A. KY Standard Specifications and Drawings: In this section, reference is made to the current Kentucky Transportation Cabinet (KYTC) Standard Specifications for Road and Bridge Construction and the KYTC Standard Drawings. In addition, construction requirements and material specifications not specifically covered in this section or in the referenced SD1 Technical Specifications shall conform to KYTC Standards. The ENGINEER or CONTRACTOR of a storm sewer project is responsible for obtaining a current edition of the KYTC Standard Specifications and the latest edition of the KYTC Standard Drawings when designing or performing work that either involves SD1 funding or is to be accepted by SD1.

B. Reference Standards:

1. ASTM C 33, Standard Specification for Concrete Aggregate.
2. ASTM C 76, Class III Reinforced Concrete Pipes.
3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.
6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.
7. ASTM C 891, Standard Practice for Installation of Underground Precast Concrete Utility Structures
8. ASTM C 913, Standard Specification for Precast Concrete Water and Wastewater Structures
9. ASTM C 923, Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
10. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
11. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
12. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.
13. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
14. ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
15. ASTM D 1737, Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus
16. ASTM D 2240, Standard Test Method for Rubber Property
17. ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
18. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
19. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
20. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
21. ASTM 4060, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
22. ASTM 4541, Standard Test Method for Pull Off Strength of Coatings using Portable Adhesion Testers
23. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.

24. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
25. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
26. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base. Shop Drawings shall show the delta angles for all points of intersection, except where more than one line intersects at the same manhole. Where more than one line intersects, the angles relating all lines shall be shown. All angles shall be shown to the nearest second.

   2. Manufacturer's name for all precast structures.

B. For the following submit:
   1. Manholes: Include plans, elevations, sections, details, and frames and covers.

   2. Drainage Structures: Include plans, elevations, sections, details, and frames, covers, and grates.

   3. Cast-in-place and Precast Structures: Include plans, elevations, reinforcing, concrete mix design, and structural calculations stamped by a Professional Engineer, registered in the State of Kentucky, competent in structural design.

   4. Pipe material and layout for prefabricated sections

   5. Any other items as requested by the ENGINEER or SD1.

C. Comply with all the requirements of Section 01340.

PART 2 STRUCTURES

2.1 GENERAL

A. Concrete for all cast-in-place storm drainage structures (including channels and benches) shall conform to Section 03300 of the SD1 Technical Specifications including a minimum 28-day compressive strength of 4,000 psi.

B. Grout shall consist of a mixture of water and cement or cement with fly ash, one part cement or cement with fly ash to two parts mortar sand as defined in Section 601.03.03B of the KYTC Standard Specifications, by volume.

C. Non-shrink grout shall be an approved non-shrink, non-staining grout consisting of either a mixture of hydraulic cement, water, fine aggregate, and an approved nonferrous expansive admixture, or a packaged commercial product and shall meet the requirements of Section 601.03.03B of the KYTC Standard Specifications.

D. Round precast structures shall conform to ASTM C 478. Square and rectangular precast structures shall meet the requirements of ASTM C 913. Structural calculations shall be provided for all precast structures as requested by SD1.

E. Benching is required in the bottom of all structures (curb inlets, yard drains, standard inlets, manholes) per SD1 standard details. Cast-in-place benches shall be of 4,000 psi concrete. The invert channels shall be constructed as to cause the least possible resistance to flow. The shapes of invert channels shall conform uniformly to inlet and outlet pipes. Smooth and uniform finishes will be required. Inverts may also be precast into the structure.

2.2 PRECAST CONCRETE MANHOLES, AIR RELEASE MANHOLES, AND BYPASS PUMPING VAULTS

A. General:

1. Precast manholes shall conform to the details shown on the Standard Details.

2. Concrete shall be minimum 4000 psi compressive strength.

3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.

   a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and

shall be concentric cone-type, top construction as shown on the Design Drawings.

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

4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.

5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.

6. Precast concrete manhole sections (including eccentric and concentric cones, risers and rings) shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.

7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only. If lifting holes do not protrude completely through the wall, no sealing is required.

8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on outside of barrel.

B. Manholes downstream of force mains

1. Where a force main connects to a new or existing manhole, that manhole shall be lined with a corrosion resistant monolithic lining conforming to SD1's Technical Specifications. SD1 may also require existing manholes up to 4 manholes downstream of the new force main discharge be similarly lined on a case-by-case basis. The cover on the force main discharge manhole shall be a solid lid (not vented). SD1 may require that additional downstream vented manhole lids be replaced on a case-by-case basis.
2. Any existing manholes to be lined shall be inspected by the DESIGN ENGINEER and SD1 to determine the conditions of the manholes and confirm if the manholes are suitable for lining. If in the opinion of SD1, the existing manholes cannot be lined, then the manholes shall be replaced.

C. Manhole Bases Sections:

1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
   a. If floatation is found to occur based on the Design Engineer's review, the engineer shall specify thickness of precast base. Precast base sections shall be furnished with an integral anti-flotation footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).
   b. Precast concrete manhole base slab thickness shall comply with the following schedule:

0.0' – 15.0'	Vertical Height	- 8" Slab
15.1' – 20.0'	Vertical Height	- 10" Slab
20.1' – 25.0'	Vertical Height	- 12" Slab
25.1' – 30.0'	Vertical Height	- 14" Slab

   c. Manholes over 30 feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to SD1 for review & approval.
   d. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
   e. There should be a minimum of twelve (12") inches between the outside diameters of all pipe penetrations in the base section. The maximum inside diameter (or horizontal dimension) of pipe to be used with a given size manhole shall be as specified on SD1 standard detail.
   f. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.

2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.
   a. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
   b. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
   c. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
   d. Bench shall slope toward invert at not less than one (1) inch per foot.

3. All precast base sections with pipe openings shall fulfill the connection requirements identified hereinafter in Paragraph 2.6 herein.

C. Manhole Barrel Sections:

1. Manhole barrel sections shall have reinforcing steel in their walls, Wall

thickness shall not be less than 5 inches.

2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.

3. The barrel sections shall be of the height required, but not less than one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.

4. Joints between manhole components shall be the tongue and groove. The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel.

5. Precast manhole section joints shall be joined with one of the following products:
   a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
   b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
   c. Hamilton-Kent “Kent-Seal No. 2”
   d. Press Seal Gasket “E-Z Stik”
   e. Or Equal

D. Cone Sections and Top Slab:
   1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case by case basis or where directed by SD1

   2. Cone sections and top slabs shall be designed for an H-20 wheel loading.

   3. Cone sections for standard manholes shall have a minimum 8” thick upper walls and shall not exceed 3’-0” in height.

   4. Concrete top slabs shall not be less than 8 inches thick.

E. Drop Manhole:
   1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.

2. The drop pipe shall be of the same material and diameter as the inlet sewer pipe used.

3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of six (6) inches.

4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by SD1.

5. Base shall be cast to support drop connection.

F. Acceptable Manufacturers
1. KOI
2. Hanson
3. or equal

2.3 MANHOLE RISERS

A. Manhole risers (adjusting rings) 6" to 10" height shall be concrete.

B. Manhole risers 2" to 5" height shall be high density polyethylene as manufactured by Ladtech, Inc or equal. Manholes that will be raised more than 10 inches will use 1-foot barrel section on inside of manhole.

C. Or other method approved by SD1 on a case by case basis

2.4 PRECAST STORM CURB INLETS, STANDARD INLETS, CATCH BASINS & YARD DRAINS

A. Precast storm drainage structures with knockout panels shall only be used for curb inlets (catch basins) and yard drains no greater than 6-ft in depth, unless load calculations are supplied. For pre-cast rectangular structures (other than those with knockout panels), at least 6 inches of wall (measured from the interior corner) is required on each side of the pipe beyond the precast opening for the pipe. This rule is not applicable for structures which have pipe installed in opposite walls or where one outlet reinforced concrete pipe is utilized. Less than 6 inches of wall may be approved by SD1 with the submittal of design calculations.

B. Base and riser sections shall be custom-made with openings to meet indicated pipe alignment conditions. The minimum distance allowed between precast holes, measured from edge to edge in a standard inlet section shall be 6 inches.

C. Joints between yard drains and standard inlet sections in the roadway or yard areas shall be sealed with one of the following:

1. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
2. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
3. Hamilton-Kent "Kent-Seal No. 2"
4. Press Seal Gasket "E-Z Stik".
5. Or equal

D. Joints between riser sections for curb inlets (catch basins) are not required to have gaskets or butyl sealant between sections. These joints can be stacked dry as long as there are no holes or gaps in the joints. All holes or gaps shall be filled with non-shrink grout.

E. For precast structures with openings cast into the unit, the minimum vertical distance from the pipe openings to the top of the structure or segment wall shall be 12 inches. If this distance is less than 12 inches, then additional reinforcing steel shall be furnished for this section. All pipe openings shall not be in joints between two precast sections unless specifically approved by SD1. The top slab must be designed for HS-20 loading in paved areas only.

F. All standard inlets shall conform to the appropriate Standard Drawings No. STM-08 through STM-11. All storm drains outside of the right-of-way shall be Standard Drawing No. STM-07, unless specifically approved otherwise by SD1. All curb inlets and catch basins shall conform to the appropriate Standard Drawings No. STM-01.1, STM-01.2, STM-04 and STM-12.

2.5 HEADWALLS AND OUTFALLS

A. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete that conforms to KTC Standard Specifications for Road and Bridge Construction.

B. Safety guards and railings: Safety guards and railings shall be provided along the top and sloped/winged sidewalls on all headwall inlet and outlet structures having a vertical drop of 4'-0" or greater. Such guards or railings shall be at least 42-inches in height measured vertically above the wall. Guards or railings shall not have an ornamental pattern that would provide a ladder effect. Vinyl coated chain link fencing and galvanized materials are an acceptable guard type.

C. Grates: Grates shall be provided on inlet headwalls for all pipes 24" and less.

D. All headwalls and outfalls shall conform to the appropriate Standard Drawings, including but not limited to, No. STM-15, STM-16, STM-17.1, STM-18.1 and STM-19.

2.6 FLEXIBLE PIPE JOINT SEAL & CONNECTIONS

A. For sanitary structures and manholes:

1. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.

2. All connecting elements of the seal shall be Type 304 stainless steel.

3. Flexible pipe joint seal shall allow for pipe alignment of up to fifteen (15) degrees deflection.

4. Pipes entering manholes that do not have existing flows and have slopes greater than ten (10) percent may have fittings (22.5 or 11.25 degree bends) installed immediately outside the manhole. This is to be evaluated on a case by case basis by SD1 or ENGINEER.

5. Acceptable Products:
   a. Kor-N-Seal by NPC, Inc.
   b. A-Lok by A-LOK Products, Inc.
   c. Dura-Seal III by Dura-Tech
   d. Or equal.

B. For storm structures and manholes with flexible pipe joint seals:

1. CONTRACTOR may use flexible connections at storm manholes which shall be elastomeric gaskets or couplings, manufactured in accordance with ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Structures, Pipes, and Laterals.

2. CONTRACTOR may use a concrete collar for opening around the pipe. The pipe shall be encased with minimum 6 inch collar of concrete from the inside face of the wall to 1'-0" outside the outer face of the wall. The pipe shall be adequately supported to prevent settling while the concrete encasement is curing. The inside faces of the structure walls shall be finished with a trowel. If a concrete collar is used, the collar shall be allowed to cure to 75% of its design strength before backfilling. The diameter of the opening shall be no more than 8 inches greater than the outside diameter of the pipe.

3. For precast structures with knockout panels, all holes for pipes shall be via a controlled cut and shall not be cut into the structural members (i.e., top beams and corner columns) and non-shrink grout shall not be allowed to be placed around the pipes without prior approval from SD1 or its Engineer. The pipes shall be encased with a minimum 6 inch concrete collar all around the outside of pipe or a minimum of 3 inches beyond the

hole knocked in the wall, whichever is greater. Also, the concrete encasement shall extend from the inside face of the wall to 1'- 0" outside the outer face of the wall. The collar shall be allowed to cure to 75% of its design strength before backfilling.

2.7 STORM LATERAL CONNECTIONS

A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc.).

2.8 MANHOLE, CATCH BASIN & STRUCTURE STEPS

A. Reinforced Polypropylene Manhole Steps: ½ inch Grade 60 steel reinforcing rod, ASTM A-615, encapsulated in copolymer polypropylene, ASTM D 2146-68 under Type II, Grade 16906.Steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be epoxy grouted into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.

B.

C. No steps shall be aligned over the flow channel. Step spacing shall be 16” as shown the Standard Detail Drawing.

D. Omit steps for structures that are less than 4-ft deep unless otherwise shown on the plans.

2.9 EXTERNAL SLEEVE FOR STRUCTURE (Sanitary Only)

A. Provide external sleeve around all manhole joints as designated on the plans. Any manholes located within fifty (50) feet or less of a creek/ stream or within a floodplain shall have an external sleeve. External sleeve shall be a wraparound heat shrinkable sleeve that creates a barrier to water infiltration and protects support of the structure and frame from ground moisture prevents corrosion and freeze-thaw damage. The system shall be compatible with and bond to concrete, metal, and fiberglass using an adhesive type primer. The sleeve shall have the following physical properties:

Softening Point	212 degrees Fahrenheit	ASTM E-28
Lap Shear Strength	12 PSI	DIN 30 672
Tensile Strength	2900 PSI	ASTM D-638

Elongation	600%	ASTM D-638
Hardness	46 Shore D	ASTM D-2240
Abrasion Resistance	45 mg	ASTM D-1044
Peel Strength	9PLI	ASTM D-1000
Water Absorption	0.05%	ASTM D-570
Low Temperature	-40 degrees Fahrenheit	ASTM D-2671D
Minimum Width	12 inches	

B. System shall accommodate ground movement and resists soil stress.

C. Acceptable Products:
1. WrapidSeal – Manhole Encapsulation System by Canusa –CPS.
2. Link- Seal Riser- Wrap Heat Shrink System.
3. Or Equal.

2.10 PVC STORM DRAINAGE STRUCTURES AND CATCH BASINS

A. PVC storm drainage structures and catch basins shall be approved on a case-by-case basis by SD1.

PART 3 EXECUTION

3.1 MANHOLE BASES

A. General

1. Manholes shall be installed at the locations shown on the Design Drawings.

2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.

3. Perform Site work as per the requirements of Specifications Sections 02050, 02110, 02220, and 02222.

4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.

5. The bases shall be placed directly on an 8-inch to 12-inch deep pad (compacted thickness) of pipe bedding material as specified in section 02220, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.

a. The excavated soils shall be replaced with an appropriate Structural Backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.

6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the SD1.

7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.

8. Compacted backfill as specified on the Design Drawings or section 02220 shall then be placed above the compacted bedding material up to finished grade.

B. Pre-Cast Bases

1. The SD1 reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the SD1 determines the products unsuitable for the SD1'S installation.

2. Doghouse manholes shall not be permitted unless written approval by SD1 or SD1 representative.

A. Cast-in-Place Bases

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

3.2 PRECAST MANHOLE SECTIONS

A. Set sections vertical with steps and sections in true alignment.

B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.

3.3 STRUCTURE CHANNELS

A. All invert channels through structures shall be constructed of 4000 psi concrete.

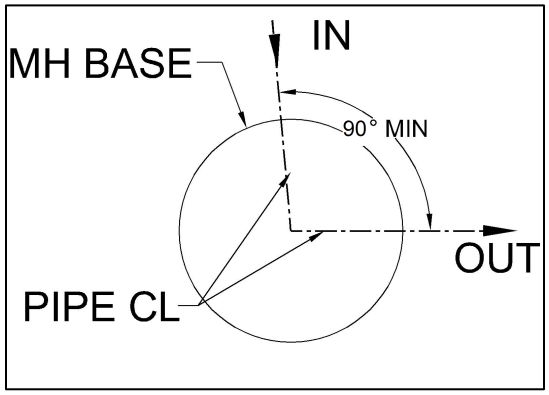
B. For precast bases, the flow line (channel) and benches shall be cast separately from the floor and side wall at the place of manufacture, unless otherwise approved by SD1.

C. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered.

D. Benches shall be built up to the heights shown or as ordered and given a uniform wood float finish.

E. Care shall be taken to slope all benches for proper drainage to the invert channel.

F. All flow channel angles between any new incoming pipe and new outgoing pipe shall be at least 90 degrees in the direction of flow as seen in the figure below. For any pipe with velocities exceeding 5 ft/s consult SD1 engineer for the required angle or for the need of an oversized manhole.



3.4 STORM CURB INLETS, STANDARD INLETS, CATCH BASINS, YARD DRAINS, HEADWALLS & OUTFALLS

A. Inlets, catch basins, drains, junction structures, and other drainage structures shall be neatly and accurately built in accordance with the plans or SD1 Standard Drawings. The structure shall be either of cast-in-place concrete or precast

concrete. Precast structure sections shall be installed in accordance with ASTM C 891.

B. All cast-in-place structures shall be built using 4,000 psi concrete as described in Paragraph 2.1. The structures shall be built on prepared foundations and conform to the dimensions and shapes shown on the Plans and SD1 Standard Drawings. The construction shall conform to the methods, forms, placement, protection, and curing for concrete as specified in accordance with KTC and SD1 Standards. Any required reinforcement shall conform to the Plans and SD1's Standard Drawings. Installed concrete reinforcing shall be inspected and approved by SD1 before any concrete is placed.

C. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete in conformance with SD1's Standard Drawings and KTC Standard Specifications for Road and Bridge Construction. All headwalls and outfalls built into slopes shall be properly seated as to avoid disconnection from the adjoined pipe.

3.5 DOGHOUSE MANHOLES

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

3.6 PIPE CONNECTIONS TO NEW STRUCTURES

A. For connections to new structures:
   1. A flexible pipe-to-manhole joint connector shall be used for joining piping to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material and be as specified herein.
      a. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
      b. If the slope of the incoming sewer exceeds 10% from the horizontal, a fitting may be used outside the manhole wall to facilitate a more perpendicular connection to the manhole wall. The use of this fitting is to be evaluated on a case by case basis by SD1.

2. All pipe connections to manholes shall match crowns. If matching crowns is not possible, a drop manhole may be approved by SD1.

3. All drop manholes shall be approved by SD1. Drop manholes may be acceptable under the following conditions:
   a. If the slope of the influent sewer is greater than or equal to five (5) percent, SD1's drop connection detail 114 shall be followed. All other influent sewer slopes and drop connections will be evaluated on a case by case basis.
   b. All other drop manhole requests shall be approved on a case by case basis including but not limited to pipe realignments, connections to existing manholes, etc.
   c. If the total height of the drop is greater than sixteen (16) feet, a drop shaft assembly shall be specifically designed for the hydraulic conditions present by a licensed professional engineer in the Commonwealth of Kentucky for the hydraulic and shall be approved by SD1.

4. Slide manholes shall not be used, unless otherwise approved by SD1.

3.7 PIPE CONNECTIONS TO EXISTING STRUCTURES

A. Perform by core drilling in accordance with Section 01045.

B. The connection to the structure shall be in accordance with the materials specified herein.

C. The flow channel and bench for the new connection shall be constructed onsite or the existing flow channel and bench modified to accept the new piping.

D. New connections to existing structures need to be greater than ninety (90) degrees to the existing flow channel in the direction of the flow.

E. Where new flows joining an existing eight (8) inch sewer that is flowing half pipe or greater, or the existing pipe is twelve (12) inches or greater, an oversized manhole shall be installed to allow a smooth, sweeping flow transition. Consult SD1 for required manhole diameter.

F. For sanitary applications, perform all connections in accordance with Paragraphs 3.9 and 3.11 herein.

3.8 SANITARY SEWER STUBS FOR FUTURE CONNECTIONS

A. Installation of stubs for future connections shall be evaluated on a case by case basis and approved by SD1. If stubs are approved, PVC, ductile iron, or fiberglass pipe stubs with approved watertight plugs shall be installed in manholes. SD1 requires that future connections to existing manholes be cored and the benching modified to accept the new connection. Where pipe stubs, sleeves or couplings for future connections are shown or ordered, CONTRACTOR shall provide all materials and work for their construction.

B. If stubs are approved by SD1, stubs out of manholes shall be a two (2) to five (5) foot stick of pipe with sealed caps. When future connections are made to these manholes, the stubs shall be removed and a full stick of pipe shall be installed at the proper slope.

C. Where connections are made to existing manholes installed after May 15, 2000, the existing manhole shall be vacuum tested prior to the connection being made. If the manhole is vacuum tested prior to alterations and fails, it is the responsibility of SD1 to repair or replace the manhole. If the manhole passes the vacuum test prior to connection, but fails the vacuum test after the connection is made, then the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

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

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

E. If the elevation or grade of an existing manhole is altered, the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

3.9 GRADING AT MANHOLES & STRUCTURES

A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.

1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.

2. Manholes in wooded or other inaccessible areas shall be installed twelve (12) inches above the final grade.

3. Confirm with land owner prior to installation of manholes in cultivated fields, hay fields and pastures. If land owner agrees manhole shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.

B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.

C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

3.10 MANHOLE WATERTIGHTNESS (Sanitary Only)

A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails a visual leakage inspection and/or vacuum testing, SD1 will consider the manhole defective and the Contractor shall provide the Engineer a plan for leak repairs for approval or replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No leak repairs shall be performed without the ENGINEER'S approval.

B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by SD1. Manholes not subject to vacuum testing must be in writing from SD1. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the SD1, 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 SD1.

C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:

1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.

2. Drop connections shall be installed prior to testing.

3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.

4. The manholes shall be backfilled and finished to design grade prior to test.

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

D. Test Procedure:

1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.

2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.

3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.

4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.

5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

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

Note: Consult SD1 on manhole diameters larger then six (6) feet.- These test pressures exceed what is in ASTM C-1244

6. If a manhole fails the vacuum test, SD1 will consider the manhole defective and the CONTRACTOR shall provide the Engineer a plan for leak repairs for approval or shall replace the manhole and/ or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No repairs shall be made to the manhole unless approved by the ENGINEER.

7. All temporary plugs and braces shall be removed after each test.

8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

3.11 STRUCTURE ABANDONMENT

A. Structure abandonment shall be per SD1 standard drawings and consist of removing structure frames, covers, grates, cone section of manholes, and similar items. All connecting pipes shall be bulk headed. The walls shall be lowered to 2 feet below final grade if in earth or to 12 inches below subgrade if in pavement. The remaining structure shall be filled with crushed stone or sand compacted to match all backfill requirements here-in or shall be filled with controlled density fill.

++ END OF SECTION ++

SECTION 02610

PIPE & FITTINGS

PART 1 – GENERAL

1.1 SUMMARY

A. CONTRACTOR shall provide all labor, materials, equipment, incidentals, and services as shown, specified, and required for furnishing, installing, and testing all buried piping, fittings, and specials specified herein. Piping herein specified includes force main & gravity sewer for sanitary and storm applications. Remove and replace all existing piping that interferes with installation of new pipe or structures or that is damaged by new installations in a manner approved by the ENGINEER.

B. The work includes, but is not limited to, the following:
   1. Piping beneath structures.
   2. Supports and restraints.
   3. Pipe encasements.
   4. Work on or affecting existing piping.
   5. Testing.
   6. Cleaning and disinfecting.
   7. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other work required to complete the buried piping installation.
   8. Incorporation of valves, meters and special items shown or specified into the piping systems as required.
   9. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping work required, beginning at the outside face of structures or structure foundations and extending away from structure.

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

1.2 RELATED WORK

- Section 02110, Clearing and Grubbing
- Section 02220, Excavation and Backfill
- Section 02606, Sanitary & Storm Structures
- Section 03300, Cast-In-Place Concrete
- Section 09900, Painting
- Division 15, Sections on Piping, Valves & Appurtenances
- Section 15052, Exposed Piping Installation
- Section 15100, Valves and Appurtenances
- Section 15121, Wall Pipes, Floor Pipes and Pipe Sleeves

- Section 15122, Piping Specialties
- Section 15140, Pipe Hangers and Supports

1.3 LIMITATIONS

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

1.4 QUALITY ASSURANCE

Requirements of Regulatory Agencies:

A. Comply with requirements of UL, FM and other jurisdictional authorities, where applicable.

B. Refer to the General and Supplementary Conditions regarding permit requirements for this Project.

1.5 REFERENCES

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

- AWWA C104, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
- AWWA C110, Standard for Ductile-Iron and Gray-Iron Fittings, 3 In.-48 In. (76 mm-1,219 mm), for Water.
- AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- AWWA C115, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- AWWA C150, Standard for Thickness Design of Ductile-Iron Pipe.
- AWWA C151, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
- AWWA C606, Grooved and Shouldered Joints.
- AWWA C800, Underground Service Line Valves and Fittings.
- AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
- AWWA M23, PVC—Design and Installation
- ASTM A 27, Standard Specification for Steel Castings, Carbon, for General Application.

- ASTM A 82, Standard Specification for Steel Wire, Plain for Concrete Reinforcement.
- ASTM A 185, Welded Steel Wire Fabric for Concrete Reinforcement.
- ASTM A 496, Deformed Steel Wire for Concrete Reinforcement.
- ASTM A 497, Steel Welded Wire Fabric, Deformed for Concrete Reinforcement.
- ASTM A 1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- ASTM A 615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- ASTM C 14, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- ASTM C 118, Concrete Pipe for Irrigation or Drainage.
- ASTM C 150, Standard Specification for Portland Cement
- ASTM C 361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
- ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- ASTM D 1238, Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.
- ASTM D 1598, Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- ASTM D 1599, Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- ASTM D 2122, Determining Dimensions of Thermoplastic Pipe and Fittings
- ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- ASTM D 2464, Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- ASTM D 2467, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
- ASTM D 3034, Bell and Spigot-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

- ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- ASTM D 3262, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- ASTM D 3754, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- ASTM D 4161 Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- ASTM D 5685, "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings.
- ASTM F 437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- ASTM F 439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- ASTM F 441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- ASTM F 493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers
- ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
- ASTM F 679, Standard Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
- ASTM F 949, Standard Specification for Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings
- ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- ASTM F 2306, Standard Specification for 12-60 inch Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications
- ASTM D 2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

1.6 SUBMITTALS

A. In addition to the requirements of Section 01340, provide the following:
   1. Size, class and other details of pipe to be used.

2. Full details of piping, specials, joints, harnessing, and connections to existing piping, structures, equipment and appurtenances.

B. Tests: Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.

C. Certificates: Submit certificates of compliance with referenced standards.

D. As requested by SD1, all pipe manufacturers that supply pipe for the project shall provide a detailed structural design taking in account the depth of burial, highway loads, bedding and backfill requirements, water elevation, soil conditions and installation procedures. All designs submitted shall have a Professional ENGINEER's stamp from Kentucky. Such design shall be received, reviewed, and approved prior to manufacture.

E. As requested by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures. As requested by SD1, pipe manufacturer's representative shall visit job site to monitor progress of pipe installation and shall notify in writing the CONTRACTOR and SD1 of any discrepancy, changes, or incorrect procedures that would prevent the pipe from performing as designed.

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

PART 2 – PRODUCTS

2.1 MATERIALS

A. Piping herein specified includes force main & gravity sewer. Refer to the pipe material schedule shown below to determine which pipe materials are acceptable for each application.

Type	**Size**	**Depth**	**Acceptable Materials**
Sanitary - Aerial	Any		Ductile Iron; PVC SDR 35 inside casing pipe
Sanitary - Gravity	Any	Less than 20'	PVC SDR 35; Fiberglass Polymer Mortar Pipe SN 46; Ductile Iron; HDPE; RCP, polypropylene (HDPP)
Sanitary - Gravity	Any	20.1' to 30'	PVC SDR 26; Ductile Iron; Fiberglass Polymer Mortar

			Pipe SN 72
Sanitary - Gravity	Any	30.1’ or greater	Fiberglass Polymer Mortar Pipe; Ductile Iron
Sanitary - Horizontal Directional Drill	Any	Any	HDPE ; Ductile Iron; Restrained Joint PVC C-900
Sanitary - Force Main	Any	Any	HDPE; Ductile Iron; PVC C-900
Sanitary – Low Pressure Force Main	Smaller than 4”	Any	PVC SDR 21, PVC Schedule 40, HPDE
Sanitary – Low Pressure Force Main	4”and Larger	Any	PVC C900, HDPE, Ductile Iron
Storm – Gravity	Any	Less than 20’	RCP; CMP; Ductile Iron; PVC SDR 35; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72
Storm – Gravity	Any	20.1’ or greater	RCP; CMP; Ductile Iron; PVC SDR 26; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72

Note: Pipe selected shall be designed for the cover and loading requirements to each project. Design calculations for pipe wall thickness and structural design shall be provided by the ENGINEER, as requested by SD1. Restrained joint calculations for force mains shall be provided for all projects. Depth is based on maximum cover to top of pipe between structures or manhole runs. Pipe shall be the same thickness between structures or manholes.

B. Refer to applicable Sections for material specifications.

C. General:
   1. Marking Piping:
      a. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4 inches in diameter and larger.
      b. Pipe and fittings smaller than 4 inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

2.2 DUCTILE IRON PIPE AND FITTINGS

A. Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.

B. Pipe Manufacturer's Experience and Field Services.
   1. All ductile iron pipe, fittings, and specials shall be fabricated, lined and coated by the pipe manufacturer. Minimum required experience shall include manufacture of a similar pipeline in length to this contract, of equal or larger diameter than the pipe to be provided with joints, lining, and coating suitable for the same or greater pressure rating specified herein, which has performed satisfactorily for the past 5 years.
   2. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience installing ductile iron pipe with joints, lining, and coating of the pipe to be provided.
   3. All ductile iron pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
   4. Each joint, including all restrained joints, shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the joint and the restraints are installed properly.
   5. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
   6. All costs for these services shall be included in the Contract Price.

C. Materials
   1. Where ductile iron pipe is required, it shall conform to ANSI/AWWA C151/A21.51, Table 1 or Table 3. Pressure class 350 shall be used for all piping, unless otherwise shown on the drawings or specified. Fittings shall conform to ANSI/AWWA C110/A21.10, or ANSI/AWWA C153/A21.53, with

a minimum working pressure rating of 350 psi. All fittings shall be suitable for a test pressure as specified herein without leakage or damage.

2. All buried pressure piping shall be push-on joint or mechanical joint. Restrained joint pipe shall be installed at the station locations shown on the Contract Drawings. All above ground piping or piping in vaults shall be flanged.
3. All gravity sewer piping shall be push-on joint or mechanical joint.
4. Push-on joints and mechanical joints shall be in accordance with ANSI/AWWA C111/A21.11.
5. As requested, restrained joint pipe shall be fabricated to the lengths required as determined by the laying schedule to be submitted as specified herein. If deviations from the approved laying schedule are required in the field as approved by SD1 and ENGINEER and field-cuts are required, CONTRACTOR shall provide restraint on the field-cut piping using, EBAA Iron "Megalug" restrained joints as specified below.
6. Field cuts shall be minimized and will be limited to only locations as necessary to install pipe, when no other alternative to using factory provided joint restraint exists.

D. Joints

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

E. Material Schedule

Push-on Joints and Mechanical Joints	ANSI/AWWA C111/A21.11
Restrained Push-on Joints Positive locking segments and/or rings (4	American "Flex-Ring", or "Lok-Ring"; U.S. Pipe "TR Flex"; Clow Corp., "Super-Lock", or

inch through 64 inch)	equal
Restrained Push-on Joints, (field-cut spigot) locking wedge type	EBAA Iron "Megalug" Series 1700, or equal. Shall only be used in locations approved by the ENGINEER.
Restrained Mechanical Joints (Factory prepared spigot) (4 inch through 48 inch)	American "MJ coupled Joints"
Restrained Mechanical Joints (field cut spigot)	EBAA Iron "Megalug" Series 1100, without exception. Shall only be used in locations approved by the ENGINEER.
Fittings	ANSI/AWWA C110/A21.1, or ANSI/AWWA C153/A21.53, all with minimum working pressure of 350 psi, and suitable for the test pressure based on the project design without leakage or damage.
Flanged Joints & Fittings	Ductile Iron, ANSI/AWWA C115/A21.5 suitable for the test pressure based on the project design without leakage or damage. Faced and drilled, ANSI B16.1 125-pound flat face. Threaded conforming to AWWA C115/A21.15.
Bolting	125-pound flat–faced flange: ASTM A 307, Grade A carbon steel hex head bolts and ASTM A563 Grade A carbon steel hex head nuts
Gaskets	Restrained Push-on and Mechanical Joints: Synthetic rubber conforming to AWWA C111/A21.11. Natural rubber is not acceptable. Flanged: 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F., conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges, or specially designed gaskets with required properties per ANSI/AWWA C111/A21.11 to meet the test pressure rating. Blind flanges shall be

	gasketed covering the entire inside face with the gasket cemented to the blind flange. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.
Joint Lubricant	Manufacturer's standard
Tapping Sleeves	316 SS, with 316 SS body and bolting, and rubber sealing gasket, suitable for the test pressure specified herein. JCM Industries, Model JCM 452 or approved equal.
Polyethylene Encasement	Seamless, ANSI/AWWA C105/A21.5; LLD-8 mil or HDCL-4 mil

F. Lining and Coating Ductile Iron Pipe and Fittings (For Sanitary Sewers Only)

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

e. The material shall contain at least 20% by volume of ceramic quartz pigment.
f. A test and service history demonstrating the ability of the material to withstand the service expected.
g. Each requirement of 2.2.F.3 above must be certified by the material supplier.

5. Field Cuts
   a. All manufacturer's procedures and recommendations shall be followed when making field cuts. Note proper field preparations and curing time of the coating.

G. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. If requested, three (3) copies of such instructions shall be delivered to the ENGINEER at start of construction.

H. Encasement
   1. Polyethylene encasement shall be provided for all buried ductile iron pipe, including all straight pipe, bends, tees, wyes, adapters, closure pieces, field restraint devices, valves and other fittings or specials, in accordance with ANSI/AWWA C105/A21.5, Method A. Preparation of the pipe shall include, but not be limited to: removing lumps of clay, mud, cinders, etc., prior to installation.
   2. Where ductile iron pipe is also embedded or encased in concrete the polyethylene encasement shall be installed over the ductile iron pipe prior to concrete placement. Polyethylene encasement is only required in a casing pipe, if grouting of the annular space is required.
   3. The pipe shall be wrapped with 8-mil thickness polyethylene tube wrap, using the recommended minimum flat tube widths for the specified pipe sizes. The polyethylene tube wrap shall be of virgin polyethylene as produced from DuPont Alathan resin or equal.
   4. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of 2-inch wide plastic backed adhesive tape. The tape shall be Polyken Number 900, Scotchrap Number 50, or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film.
   5. The polyethylene film supplied shall be clearly marked at a minimum of 2-ft along its length, containing the following information:
      a. Manufacturer's name or trademark
      b. Year of Manufacture
      c. ANSI/AWWA C105/A21.5
      d. Minimum film thickness and material type (LLDPE or HDCLPE)
      e. Applicable range of nominal pipe diameter size(s)
      f. Warning--Corrosion Protection--Repair any Damage

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

A. Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping – Schedule Rated Pipe:
   1. Pipe and Fitting Material:
      a. Standard: ASTM D 1784.
      b. Type: Type I, Grade 1, rigid (12454-B).
   2. Pipe:
      a. PVC:
         1) Standard: ASTM D 1785.
         2) Designation: PVC 1120.
      b. CPVC:
         1) Standard: ASTM F 441.
   3. Joints:
      a. General: Connect pipe by solvent cementing except where flanged or threaded fittings are required at expansion joints, valves, flow meters, equipment connections or otherwise shown or directed.
      b. Flanged Joints:
         1) Use flanges joined to pipe by solvent cementing.
         2) Flange Drilling and Dimensions: Comply with ANSI B16.1.
         3) Flange Gaskets: Viton full face.
         4) Bolts, Nuts and Washers: Type 316 stainless steel.
         5) Provide washers on each face of the bolted connection.
      c. Threaded Joints:
         1) Taper Pipe Threads: ANSI B2.1.
         2) Joint Preparation: Teflon tape.
         3) Use PVC dies for taper pipe threads.
      d. Primer and Solvent Cement:
         1) Standard:
            a) PVC: ASTM D 2564.
            b) CPVC: ASTM F 493.
   4. Fittings:
      a. Socket-Type:
         1) PVC:
            a) Standard: ASTM D 2467.
            b) Designation: PVC I.
         2) CPVC:
            a) Standard: ASTM F 439.
            b) Threaded Type:
               i. PVC:
                  (a) Standard: ASTM D 2464.
                  (b) Designation: PVC I.
               ii. CPVC:
                  (a) Standard: ASTM F 437.

B. Polyvinyl Chloride (PVC) Piping – Gravity Sewer Pipe and Fittings:
   1. Pipe and Fitting Material:

a. Standard: ASTM D 1784.

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

C. Profile Wall Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)
1. PVC open or closed profile pipe meeting the requirements of ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

D. Corrugated Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)
1. Corrugated PVC pipe meeting the requirements of ASTM F 949, Latest Revision, "Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings".
2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

2.4 POLYVINYL CHLORIDE (PVC) PIPE – C900 PIPING (FORCE MAINS)

A. This pipe shall meet the requirements of AWWA C900-75 for Polyvinyl Chloride (PVC) Pressure Pipe. The pipe shall be PVC 1120 pipe with cast iron pipe equivalent ODs. See Table 1 below for pipe material depth and pressure limitations.

B. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring which meets the laboratory performance of ASTM D3139. The bell section shall be designed to be at least as strong as the pipe wall.

C. Standard laying lengths shall be 20 feet ± for all sizes. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure. The integral bell shall be tested with the pipe.

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

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

F. Appropriate restraint shall be provided for all fittings. Fittings shall be restrained with EBAA Iron Mega-Lugs, or equal. Pipe joints on either side of the fittings shall also be restrained to the distance required by the restrained joint calculations with the appropriate EBAA Iron Mega- Lug. The appropriate restraints are listed below:
   1. Series 2000SV& 2000PV: MEGALUG Restraint for existing C900 PVC Pipe at DIP
   2. Series 2800: MEGALUG Restraint Harness for C900
   3. Series 2200: MEGALUG Restraint for C900 at DIP Mechanical Joint fitting

G. Pipe material depth and pressure limitations (Table 1)

Table 1 – Pipe Material Depth and Pressure Limitations

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

Table Notes:

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum

acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.

2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA *Design of Ductile Iron Pipe* brochure, *Uni-Bell Handbook of PVC Pipe Design and Construction*, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.

3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.

4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.

5. For C900 PVC pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).

2.5 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Smooth Wall

1. Qualification of Manufacturers: Qualified manufacturers shall be firms regularly engaged in the manufacture of HDPE pipe and pipe fittings of the same size, type, and joint configuration specified, and whose products have been in satisfactory use for not less than five (5) years.
2. Heat Fusion Training/Certification: The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received training in the manufacturer's recommended procedure not more than 12 months prior to commencing construction.
    a. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience in making heat fusion joints and installing HDPE pipe.
    b. All HDPE pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The fusion pipe manufacturer's field

service representative shall coordinate his services with CONTRACTOR.

c. Each joint shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the pipe is properly fused.

d. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling, fusion, and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.

e. All costs for these services shall be included in the Contract Price.

3. Interchangeability of Pipe and Fittings: Within Contract limits, pipe and fittings from different approved manufacturers shall not be interchanged.

4. HDPE shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, percent carbon, (from pipe) dimensions and ring tensile strength.

5. Materials used for the manufacture of HDPE pipe and fittings shall be PE3408 HDPE, meeting cell classification 345434C or 345434E per ASTM D 3350 and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D 1248; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute (PPI) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1,600 psi at 73° F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet those requirements.

6. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Directional fittings 16-inch IPS and larger such as elbows, tee, etc., shall have a plain end inlet for butt fusion and flanged directional outlets.

7. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the test required under ASTM D 3261.

8. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of

small V-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.

9. Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
10. Joints between HDPE pipes and between HDPE fittings and pipes shall be fusion bonded as described in Section 3.5.
11. The exterior of the HDPE pipe shall be color coded and striped in a way to identify the difference in pipe service, size and application.
12. HDPE pipe shall be black.
13. All piping used for horizontal directional drilling shall be permanently striped.
14. Internal 316 stainless steel stiffeners as manufactured by JCM Industries, Inc., or approved equal shall be used at all locations where external connectors or restraint clamps are installed. MJ adapters as manufactured by Central Plastics Company or equal, with creation of positive restraint to the pipe from heat fusion of the adapter to the pipe, and creation of positive restraint at the connection through bolting of the backup ring to the MJ valve or fitting, can be used in lieu of the JCM internal stainless steel stiffeners and external restraint clamps.
15. Except as noted in item 14 above, all mechanical connections shall be stiffened and restrained. Restraints shall be as manufactured by JCM Industries, Inc., or approved equal.
16. External restraint clamps utilized for transition from ductile iron pipe to polyethylene pipe shall be as manufactured by JCM Industries, Inc., or approved equal. Restraints must be compatible with stiffeners and pipe. JCM restraints shall not be used with HDPE pipe in locations where test pressures will exceed 150 psi. In locations where HDPE pipe will have test pressures exceeding 150 psi, provide an MJ adapter as described in item 14 above.

17. The Dimension Ratios (DR's) are shown on the table (Table 2) below:

Table 2 – Pipe Material Depth and Pressure Limitations

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

Table Notes:

1. Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.
2. Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA Design of Ductile Iron Pipe brochure, Uni-Bell Handbook of PVC Pipe Design and Construction, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.
3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4˚F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.
5. For C906 HDPE pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).
    a. The DR's shall be verified by the Design ENGINEER and the manufacturer for the laying and pressure conditions shown on the drawings, including full consideration of vacuum, with calculations submitted to SD1 for review. NOTE: Manufacturers who do not comply with this requirement will not be considered an equal. The CONTRACTOR shall be liable if the pipe fails or pulls apart. The minimum DR shown above shall be used unless a thicker wall DR is recommended by the manufacturer during his verification. For horizontal directional drilling (HDD), pipe installed at depths from 0'-15' deep shall have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. HDD pipe installed at depths greater than 15' shall also have a minimum DR 9 rating or manufacturer's minimum recommended DR, whichever is more conservative. **CONTRACTOR shall note that depending on the wall thickness of the pipe to be furnished, an increase in pipe size may be required to provide comparable internal diameter to ductile iron pipe.**

18. Mechanical joint ductile iron fittings for DIP sized HDPE pipe meeting all requirements of ANSI A211.11 (AWWA C111) may be used in lieu of HDPE

pipe fittings. Restraints shall be Sur-Grip as manufactured by JCM Industries, Inc., or approved equal.

19. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.
20. HDPE pipe shall have OD of ductile iron pipe.
21. HDPE pipe shall be as manufactured by CP Performance Pipe, or equal.

B. Corrugated HDPE (For Storm Sewer Only)

1. Corrugated polyethylene pipe with an integrally formed smooth interior shall meet the requirements of AASHTO M 294, Standard Specification for Corrugated Polyethylene Pipe, 12 to 36 inch diameter, for Type S pipe. SD1 will consider the use of large diameter HDPE on a case-by-case basis; approval shall be at SD1's discretion
2. HDPE pipe shall be joined using an inline bell (IB) & spigot joint or fitting meeting AASHTO M294 or ASTM F2306. The joint or fitting shall be soil-tight and gaskets shall meet the requirements of ASTM F477.

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

A. Fiberglass reinforced polymer mortar (fiberglass) pipe and fittings for gravity sewers shall conform to the requirements of ASTM D-3262, current approval, “Standard Specification for ‘Fiberglass’ (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe.”

B. Materials

1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
2. Glass Reinforcements: Chopped glass reinforcement fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins. Continuous circumferential glass reinforcement fibers, where utilized, shall be of grade ECR-glass with binder and sizing compatible with impregnating resins.
3. Silica Sand: Sand shall be a minimum of 98% silica with a maximum moisture content of 0.2%.
4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.
5. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

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

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

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

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

G. Packaging, Handling, and Shipping shall be done in accordance with the manufacturer's instructions.

2.7 REINFORCED CONCRETE PIPE (RCP)

A. Circular reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Storm Pipe. Elliptical reinforced concrete pipe shall meet the requirements of ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe.

B. Rubber and plastic joints, or approved equal, shall be the jointing method for RCP and shall meet the requirements of AASHTO M 315 / ASTM C 443. Other methods of joining RCP will only be allowed upon explicit approval from SD1.

C. When RCP is used under pavement or driveways, a minimum of Class III RCP shall be required or higher class as noted on drawings.

2.8 CORRUGATED METAL PIPE (CMP) (FOR STORM SEWERS ONLY)

A. Corrugated steel pipe shall meet the requirements of AASHTO M36. Corrosion protection shall be provided through an aluminized coating conforming to AASHTO M274. Aluminum alloy spiral pipe shall meet the requirements of AASHTO M196. Coating materials shall be evaluated on a per project basis. Asphalt coatings shall not be permitted for corrugated metal pipe.

B. Joints for CMP shall be made using coupling bands and gaskets meeting the requirements of AASHTO M 36 and AASHTO M 274.

2.9 HIGH-PERFORMANCE POLYPROPYLENE PIPE

A. For sanitary sewer applications, high-performance polypropylene pipe shall meet the requirements of ASTM F2736 for 12"-30" pipe, and ASTM F2764 for 30"-60" pipe.

B. For sanitary sewer applications, pipe shall be joined with an extended reinforced integral bell & double gasketed spigot to provide a watertight seal in accordance with ASTM D3212.

C. For storm sewer application, high-performance polypropylene pipe shall meet the requirements of ASTM F2881 and AASHTO M330.

D. For storm sewer application, pipe shall be joined with a extended reinforced integral bell & gasketed spigot in accordance with ASTM D32212.2.9

2.10 TRACER WIRE

A. All pressure pipe shall have marking tape 6" wide. Marking tape for the manhole shall be green with the words "Sanitary Sewer" installed approximately twelve (12) inches above the pipe and shall continue for the length of the pipe installation.

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

2.11 PIPE COUPLINGS

A. For new pipe installation, transition between two differing pipe materials must be done at manhole terminations, unless another method is approved by SD1. For connections to existing sewers of differing pipe material, Frenco "flexible couplings" or equal shall be used.

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

2.12 WYE BRANCH FITTINGS AND LATERALS FOR NEW CONSTRUCTION

A. Tee or wye branch fittings shall be used for household or service connection lines to the sewer collector line. The fittings shall meet the requirements of the mainline pipe materials as specified herein. The wyes and tees shall be located as shown on the Contract Drawings or as directed by the ENGINEER. The wyes and tees shall be positioned as to require the least number of fittings per lateral connection. Regular wye connections shall be in accordance with Standard Drawing No. 120. Stack wye connections shall include vertical piping, elbows, wye, and concrete encasement in accordance with Standard Drawing No. 108. If a single sweep tee connection is used, the sweep must be in the direction of sanitary sewer main

B. Inserta Tee pipe fittings are permitted as an alternate lateral tap connection in lieu of wye fittings when main pipe nominal diameter is greater than 12" or on a case by case basis for new construction. Inserta Tee type shall be compatible for the pipe type be tapped. Contractor shall be responsible for supplying the proper Tee. Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawing 102.

C. Lateral extensions shall be installed from the end of the regular or stack wye connection to the limit of easement or public right-of-way in accordance with Standard Drawing No. 120.

2.13 CONNECTIONS TO EXISTING SEWERS

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

2.14 STORM LATERAL CONNECTIONS

A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc).

PART 3 – EXECUTION

3.1 GENERAL

A. Contractor shall refer to Section 02220 for all excavation, trench preparation, bedding and backfill requirements.

B. After being delivered alongside the trench, the pipe, fittings, and specials shall be carefully examined for cracks, soundness, or damage, or other defects while suspended above the trench before installation. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. Before each piece of pipe is lowered into the trench, it shall be thoroughly cleaned out. Each piece of pipe shall be lowered safely and separately in the trench. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe.

C. The bell and spigot of the joint shall be thoroughly wire brushed and cleaned of dirt and foreign matter immediately prior to jointing. The contact surfaces shall be coated with the lubricant, primer or adhesive recommended by the manufacturer, and then the pipe shall be pushed together until the joint snaps distinctly in place. The pushing together of the pipe may be done by hand or by the use of a bar.

D. Place pipe to the grades and alignment indicated, runs of pipe between manholes shall be within 95% of the slope shown on the plans unless otherwise directed by the ENGINEER. Remove and relay pipes that are not laid correctly. Slope piping uniformly between elevations shown.

E. Trenches shall be kept dry during pipe laying. Before pipe laying is started, all water that may have collected in the trench shall be removed. Ensure that ground water level in trench is at least 12 inches below bottom of pipe before laying piping. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete and protect and keep clean water pipe interiors, fittings and valves.

F. All pipe shall be laid starting at the lowest point and proceed towards the higher elevations, unless otherwise approved by ENGINEER. Place bell and spigot pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.

G. When laying of the pipe is stopped, the end of the pipe shall be securely plugged or capped. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious material.
   1. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
   2. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.

3. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.

H. As required by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures prior to the start of the Work.

I. Install piping as shown, specified and as recommended by the manufacturer. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from SD1 before proceeding.

J. Deflections at joints shall not exceed 75 percent of the amount allowed by the pipe manufacturer.

K. Field cut pipe, where required, with a machine specially designed for cutting piping. Make cuts carefully, without damage to pipe or lining, and with a smooth end at right angles to the axis of pipe. Cut ends on push-on joint shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.

L. Touch up protective coatings in a satisfactory manner prior to backfilling. See pipe material section for specific requirements.

M. Place concrete pipe containing elliptical reinforcement with the minor axis of the reinforcement in a vertical position.

N. Laying Pipe and Service Laterals
1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
a. Ductile Iron Pipe: AWWA C600, AWWA C105.
b. Concrete Pipe: AWWA M9, Concrete Pipe Handbook.
c. Thermoplastic Pipe: ASTM D 2774.
d. ASCE Manual of Practice No. 37.

3.2 PIPE INSTALLATION – GENERAL

A. Excavation for Pipeline Trenches: Refer to Section 02220. Trenches in which pipes are to be laid shall be excavated to the depths shown on the Drawings or as specified by the ENGINEER. Minimum cover for all pipelines shall be 36 inches minimum cover as measured from top of pipe, unless otherwise shown on the Drawings or approved by the ENGINEER. Trench excavations maybe inspected by ENGINEER prior to laying pipe. Notify SD1 48 hours in advance of all excavating, bedding and pipe laying operations.

B. Jointing: The types of joints described herein shall be made in accordance with the manufacturer's recommendations.

C. Separation of Sanitary Sewers and Potable Water Pipe Lines:
   1. Horizontal Separation:
      a. Wherever possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers and service lines shall be separated horizontally by a clear distance of not less than 10 feet.
      b. If local conditions preclude a clear horizontal separation of not less 10 feet, the installation will be permitted provided the potable water main is in a separate trench or on an undistributed earth shelf located on one side of the sewer and at an elevation so the bottom of the potable water main is at least 18 inches above the top of the sewer.
      c. Exception:
         1) Where it is not possible to provide the minimum horizontal separation described above, the potable water main must be constructed of cement lined ductile iron slip-on or mechanical joint pipe complying with the public water supply design standards of the governing agency. Sewer must be constructed of epoxy lined ductile iron slip-on or mechanical joint pipe complying with SD1's requirements.
   2. Crossings:
      a. Provide a minimum vertical distance of 18 inches between the outsides of pipes.
      b. Center one full length section of potable water main over the sewer so that the sewer joints will be equidistant from the potable water main joints.
      c. Provide adequate structural support where a potable water main crosses under a sewer to maintain line and grade.
      d. Exceptions:
         1) See requirements in paragraph 3.2.C.1.c.(1) above.
         2) Concrete encase as directed by SD1.

D. Permanent slope anchors shall be installed on all pipe with slopes over twenty (20) percent. See the SD1's standard detail for Concrete Anchor Block. Consult with SD1 on spacing of the anchors.

E. Reaction Anchorage (Pressure Pipe Only):
   1. All tees, Y-branches, bends deflecting 11-1/4 degrees or more, and plugs which are installed in buried piping shall be provided with proprietary restrained joint systems for preventing movement of the pipe and joints caused by the internal test pressure.

F. Thrust Restraint
   1. Provide thrust restraint on pressure piping systems where shown and specified.
   2. Thrust restraint for DIP shall be accomplished by means of restrained pipe joints.

3. Thrust restraints shall be designed for the axial thrust exerted by the system design pressures as specified by the Design ENGINEER.

G. Dewatering and Ground Water

1. Discharging of sediment laden groundwater or rainwater from excavations directly to watercourses or storm sewers is prohibited. Failure of the CONTRACTOR to comply with the requirements of this specification may result in SD1 issuing a stop work order or non-approval of pay estimates until the CONTRACTOR puts measures in place to comply with this specification. All costs associated with the stop work or non-approval of pay estimates shall be at the CONTRACTOR's sole expense.
2. Pipe trenches and excavations for appurtenances shall be kept free from water during trench bottom preparation, pipe laying and jointing, pipe embedment and building of appurtenances in an adequate and acceptable manner.
3. Where the trench or excavation bottom is mucky or otherwise unstable because of ground water, or where the ground water elevation is above the bottom of the trench or excavation, the ground water shall be lowered by means acceptable to the ENGINEER to the extent necessary to keep the trench or excavation free from water while the trench or excavation is in progress. The discharge of ground water from the trench or excavation area shall be by the methods specified below to natural drainage channels, gutters, drains, or storm sewers which will conduct the water away from the trench or excavation area. Means of diverting any surface water away from the trench or excavation area shall be taken and surface water prevented from entering the trench or excavation area.
4. Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during sub grade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is com-pleted to the extent that no damage from hydrostatic pressure, flo-tation, or other cause will result.
5. All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations a minimum of 6 inches or more below the bottom of the excavation.
6. Surface water shall be diverted or otherwise prevented from entering excavations or trenches to the greatest extent possible without causing damage to adjacent property.
7. Groundwater and rainwater removed during dewatering shall be discharged onto undisturbed ground where vegetative cover exists or through sediment and erosion controls and allowed to flow overland to filter out any sediments before discharging to any drain, storm sewer, or watercourse specified above. No such flows are permitted onto exposed soils, stream banks, or other areas subject to erosion.
8. Where overland flow on existing undisturbed ground is not sufficient to adequately remove all sediment from dewatering operations prior to discharge

to any drain, storm sewer, or watercourse, or other erosion control measure acceptable to SD1 or ENGINEER shall be used to remove the sediment from the water prior to discharge. The method of discharging ground water or rain water from the trench or excavation area shall be such as to not create any erosion of existing ground.

9. All discharge locations shall be approved prior to construction by the ENGINEER and SD1.
10. CONTRACTOR shall take measures to prevent damage to properties, structures, sewers, and other utility installations and other work.
11. CONTRACTOR shall repair all damage, disruption, or interference resulting directly or indirectly from groundwater control system operations at no additional cost to SD1.
12. The CONTRACTOR shall maintain the components of the dewatering system and surface water erosion and sediment controls within the project site. Deficiencies identified during visual inspection by SD1, SD1's representatives, or the governing regulatory authority shall be remedied by the CONTRACTOR at no additional cost to SD1.
13. Dewatering system components shall be located where they will not interfere with construction activities adjacent to the work area.
14. The CONTRACTOR shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

H. Ground Water Barriers:

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

I. Pipe Encasements:

1. Concrete Encasement
    a. Wherever pipe encasement is called for on the plans or ordered in by SD1, the CONTRACTOR shall construct the encasement as shown on the drawings or in accordance with SD1's standard drawings.
    b. Support the pipe sections on solid concrete blocks, being sure to keep the pipe sections on line and grade and then pour concrete, completely under each section, along each side and up to a point at least twelve (12) inches above the top of each section, making sure that all voids are filled. In lieu of blocks, the CONTRACTOR may use a bed of concrete, to initially support the pipe sections.
    c. The minimum dimension of concrete under the pipe sections shall be six (6) inches and on each side of the sections shall be twelve (12) inches.

This encasement shall be reinforced around the top and sides of the pipe as shown on the Contract Drawings for creek crossings and other locations. If the trench walls are nearly vertical from the bottom of the trench up to a point to which the encasement is to be poured, forms for forming the encasement may be omitted and the concrete poured to and against the trench walls. Where trench walls are not nearly vertical, proper forms shall be set for forming the encasement, unless otherwise called for by SD1. The space between the trench walls and any formed encasement shall be filled and compacted with approved pipe bedding or backfilling material.

d. Care shall be taken to assure that the pipe sections remain on line and grade during the placing of concrete and that the joints are not disturbed. Backfill shall not be placed for a minimum of six (6) hours after encasement is completed, unless otherwise approved by SD1.
e. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.

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

Cascade Waterworks MFG Co., Advanced Products and Systems (APS) or other approved equal.

J. Work Affecting Existing Piping
   1. Location of Existing Piping:
      a. Locations of existing piping shown should be considered approximate.
      b. CONTRACTOR shall determine the true location of existing piping to which connections are to be made, and location of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
      c. Conform to applicable requirements of Division 1 pertaining to cutting and patching, and connections to existing facilities.
   2. Taking Existing Pipelines Out of Service:
      a. Do not take pipelines out of service unless specifically noted on the Drawings, or approved by SD1.
   3. Work on Existing Pipelines:
      a. Cut or tap pipes as shown or required with machines specifically designed for this work.
      b. Install temporary plugs to prevent entry of mud, dirt, water and debris.
      c. Provide all necessary adapters, fittings, pipe and appurtenances required to complete the Work.

K. Install service laterals per SD1's standard details and per the requirements specified in this specification,.

L. Bedding and backfilling of pipeline trenches shall be in accordance with the requirements set forth in Section 02220 and as shown on SD1's trench compaction detail.

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

3.3 DUCTILE IRON PIPE INSTALLATION REQUIREMENTS

A. Jointing Pipe:
   1. Ductile Iron Mechanical Joint Pipe:
      a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
      b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.

c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
f. Insert bolts and hand tighten nuts.
g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

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

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

3. Proprietary Joints:

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

B. Polyethylene Tube Wrap Installation

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

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

a small hole in the film and insert a short pipe nipple to drain the water to the soil outside the film wrap.

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

3.4 HDPE INSTALLATION REQUIREMENTS

A. Pipe Joining

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

B. Installation

1. Installation shall be in accordance with ASTM D 2321, manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with all applicable safety codes and standards.
2. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In no case shall the flanged bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer. At least one (1) hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft.-lbs. or as recommended by the manufacturer.

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

3.5 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE INSTALLATION REQUIREMENTS

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

3.6 FIBERGLASS PIPE INSTALLATION REQUIREMENTS

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

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

3.7 SANITARY SEWER TESTING REQUIREMENTS

A. General:
1. Test all piping.
2. All piping shall be tested prior to post-construction CCTV operations.
3. Notify SD1 at least 48 hours in advance of testing.
4. Conduct all tests in the presence of SD1.
5. Remove or protect any pipeline-mounted devices which may be damaged by the test pressure.
6. Provide all apparatus and services required for testing, including but not limited to, the following:
    a. Test pumps, bypass pumps, hoses, calibrated gauges, meters, test containers, valves and fittings.

b. Temporary bulkheads, bracing, blocking and thrust restraints.

7. Provide air if an air test is required and power if pumping is required.
8. CONTRACTOR shall provide fluid required for testing.

B. Force Mains Test Schedule:
1. The required hydrostatic test pressures shall be as specified by the Design ENGINEER and approved by SD1.
2. Unless otherwise specified, the required hydrostatic test pressures are at the lowest elevation of the pipeline.

C. Pressure Test Procedure for Force Mains:
1. Complete backfill and compaction of entire pipe before testing, unless otherwise required or approved by ENGINEER.
2. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
3. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
4. A successful test shall be defined as zero drop in the specified test pressure during the two hour testing period.

D. Displacement of Pipe
1. The sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade have occurred as each portion of the sewer is completed between manhole locations. When the test is required by SD1, it shall be as follows:
   a. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between manhole locations or by utilizing a laser beam.
   b. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
   c. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect to the satisfaction of SD1.
   d. This test may be done after the pipe sections have been laid, the joints completed and the bedding completed to twelve (12) inches above the pipe sections, or after completion of the sewer and all backfilling has been undertaken or both.

E. Deflection of Pipe
1. A deflection test shall be performed on all gravity sanitary sewers using flexible pipe. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid mandrel, or equal means approved by SD1, and shall have a diameter equal to ninety-five percent

(95%) of the inside diameter of the pipe, including the pipe manufacturer's tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.

F. Air Test for Gravity Sewers 42" and Smaller
   1. The CONTRACTOR shall test the tightness of the pipe sections, joints and appurtenances of all gravity sewers by means of the low pressure air test.
   2. No tests shall be made until the backfill is consolidated over the pipe and all service lines in the section to be tested have been connected and plugged.
   3. The low pressure air test shall be conducted in accordance with procedures outlined in UNIBELL Specification UNI B-6. If the section of sewer being tested is below the elevation of ground water in the trench, the test pressure shall be 0.5 psi for each foot of ground water above the invert of the pipe.
   4. All tests must be witnessed and approved by a representative of SD1.
   5. Any leaks determined from the air test shall be fixed by the CONTRACTOR using an SD1 approved method.
   6. The minimum air test pressure for all gravity sewers shall be 4 psi.

G. Individual Pipe Joint Testing for Gravity Sewers 48" and Greater.
   1. The CONTRACTOR shall test each individual joint of the gravity sewers using the following procedure:
      a. Center the joint tester over the joint. Using the manufacturers approved testing apprartus and other recommendations, Inflate the outer element filling the center of the joint tester cavity with water or air, dependent upon test used, until it flows evenly from the bleed off valve, which removes air from the outer cavity. The bleed off valve shall be located at the top of the joint tester assembly. Close the bleed –off valve and pressurize the cavity to 3.5 to 5.5 psig depending on groundwater back pressure. Allow pressure to stabilize for 10 to 15 seconds and turn off pressure source. If pressure holds or drops less than 1 psi for 1 minute the joint is acceptable. The pressure gage used shall read in one (1) psi increments.

3.8 STORM SEWER TESTING REQUIREMENTS

A. Pipe shall be fully backfilled and compacted at least 30 days prior to testing.

B. Deflection: Under normal circumstances, the CONTRACTOR shall test approximately 20% of all flexible storm sewer piping, as determined and at locations directed by SD1, by use of a calibrated mandrel or other device/method approved by SD1, to ensure that no pipe deflection has occurred greater than five (5) percent of the inside diameter of the pipe. If, however, SD1 determines additional deflection testing is required based on the condition of the system or other circumstances, SD1 reserves the right to require such testing at no additional cost to SD1. The CONTRACTOR shall test the entire length of the sewer installed from structure to structure. Any pipe section exhibiting greater than 5 percent deflection shall be

repaired in a manner approved and acceptable to SD1 and retested, at no additional cost to SD1. If the pipe fails a second deflection test, the pipe shall be replaced and retested at no additional cost to SD1.

C. Displacement: Storm sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade has occurred as each portion of the sewer is completed between structure locations. When the test is performed, it shall be as follows:
   1. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between structure locations or by utilizing a laser beam.
   2. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
   3. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect, at the CONTRACTOR'S sole cost, to the satisfaction of SD1.

3.9 REPAIR OF FAILED PIPE SECTIONS

A. If a pipe section failed testing as outlined in Paragraphs 3.7 & 3.8 herein. Contractor shall repair the failed pipe sections as follows:
   1. Contact SD1 24 hours prior to making any repairs to failed pipe sections. SD1 shall be present during the entire duration of time repairs are being made to failed sections of pipe.
   2. The CONTRACTOR shall remove and replace, at no extra cost to SD1 all sections of pipe which fail any of the tests specified in this section in accordance with the following procedures:
      a. Excavate failed sections of pipe in accordance with Section 02220.
      b. Cut out and/or remove failed sections and relay new pipe beginning at nearest joint.
      c. Close pipe with pipe coupling per manufacturer's recommendation and approval of SD1.
   3. The CONTRACTOR shall provide all material, labor, and equipment necessary to remove and replace the failed pipe section.
   4. Retest the replaced sewer sections to meet the applicable requirements listed in Paragraphs 3.7 & 3.8 herein.

3.10 PIPE ABANDONMENT

A. Pipe abandonment in non-paved roadway:
   1. Pipe abandonment under non-paved roadways shall be as outlined in SD1 Standard Detail No. 107 (SD-107). Ends of pipe shall be filled with minimum of 1' of concrete.

B. Pipe abandonment in paved roadway:
   1. Pipe abandonment under paved roadways shall consist of completely filling the designated pipes with controlled density fill (CDF), grout or other approved materials. Appreciable deposits of debris shall be removed from other pipes prior to placement of CDF, grout or other approved materials. Pipes under roadways shall be filled completely

C. On Pipe abandonment in for manholes that remain, re-work bench to eliminate invert.

3.11 CLEANING FOR SEWERS

A. Cleaning:
   1. Thoroughly clean all piping and flush in a manner approved by ENGINEER, prior to placing in service.

3.12 CLEAN-UP

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

++ END OF SECTION ++

SECTION 02900

LANDSCAPING

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and perform landscaping Work.
   2. The extent of the landscaping Work shall be performed as shown and includes establishment of turf for all areas disturbed during the Work.
   3. The types of landscaping Work required include the following:
      a. Topsoil stockpiled for reuse.
      b. Topsoil from offsite sources if topsoil stockpiled is insufficient to complete the Work of this Section.
      c. Lawn areas.
      d. Maintenance Work as specified until completion of the Contract.
      e. Soil amendments.
      f. Fertilizers.
      g. Fencing.
      h. Signs.
      i. Mailboxes.
      j. Guardrails.
      k. Shrubs and ornamental landscaping.
      l. Other miscellaneous items impacted by construction.
      m. Guarantees.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the landscaping.
   2. Notify other contractors in advance of the installation of the landscaping to provide the other contractors with sufficient time for the installation of items included in their contracts that must be installed before the landscaping.
   3. Notify Property Owners 48 hours prior to working on their property.

C. Related Sections:
   1. Section 02220, Excavation and Backfill.

1.2 QUALITY ASSURANCE

A. Source Quality Control:
1. General:
a. Ship landscape materials with certificates of inspection as required by governmental authorities.
b. Comply with governing regulations applicable to landscape materials.
c. ENGINEER may request inspection of delivery slips for materials to verify specified quantities of bulk deliveries of soil amendments, fertilizers, and seed.

2. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Analytical Chemists, wherever applicable or as further specified.

3. OffSite Topsoil: Obtain topsoil from local sources or from areas having similar soil characteristics to that found at the site of the Work. Obtain topsoil only from naturally well drained sites where topsoil occurs in depth of not less than 4 inches; do not obtain from bogs or marshes.
4. Topsoil stockpiled for reuse: Topsoil may be inspected by ENGINEER before reuse. At the time of inspection ENGINEER may require representative soil samples to be tested for physical properties, hydrogen ion value, organic matter, and available phosphoric acid and potassium. Supply sufficient sample amount.. If deficiencies in the topsoil are found, as a result of this analysis, they shall be corrected at no additional expense to SD1.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.

1. ANSI Z60.1, American Standard for Nursery Stock.
2. ASTM C 602, Agricultural Liming Materials.
3. ASTM D 2487, Classification of Soils for Engineering.
4. ASTM D 977, Emulsified Asphalt.
5. Association of Official Analytical Chemists, Official Methods of Analysis.
6. American Joint Committee on Horticultural Nomenclature, Standardized Plant Names.
7. Official Seed Analysists of North America, Standards of Quality.
8. FSOF241D, Fertilizer, Mixed, Commercial.

9. FSOP166E, Peat Moss; Peat, Humus; and Peat, Reedsedge.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
1. Before delivery of offsite topsoil, a written statement giving the location of the properties from which the topsoil is to be obtained and the names and addresses of the suppliers.
2. Manufacturer's specifications and installation instructions for all materials required.

B. Test Reports: Submit for approval the following:
1. Before delivery of offsite topsoil, a soil analysis made by an approved soil testing laboratory stating porosity, the percentages of silt, clay, sand and organic matter, the pH and the mineral and plant nutrient content of the topsoil. Supply topsoil with 5 percent organic matter minimum.

C. Certificates: Submit for approval the following:
1. Certificates of inspection as may be required by governmental authorities to accompany shipments, and manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. For standard products submit other data substantiating that materials comply with specified requirements.
2. Certificates from seed vendors certified statement for each seed mixture required, stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials:
1. Do not deliver seed until site conditions are ready for planting.
2. Deliver packaged materials in original, unopened containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.
3. Furnish seed in sealed, standard containers.
4. Notify ENGINEER of delivery schedule in advance so plant material may be inspected upon arrival at job site.
5. Remove unacceptable material immediately from project site.

B. Storage of Materials:
1. Store and cover materials to prevent deterioration. Remove packaged materials which have become wet or show deterioration or water marks from the site. Replace at no further cost to SD1.
2. Seed that is wet or moldy or that has been otherwise damaged in transit or storage is not acceptable. Replace at no further cost to SD1.

1.5 JOB CONDITIONS

A. Environmental Requirements:
1. Proceed with and complete the Work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape Work required.
2. Minimize the disturbed construction area and begin temporary or final stabilization and restoration within fourteen (14) days per the Erosion Prevention and Sediment Control Plan or Per State and Local Requirements.
3. Do not spread seed when wind velocity exceeds 5 miles per hour.
4. Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.

B. Scheduling:

1. Plant or install materials only during normal planting seasons for each type of landscape Work required. Correlate planting with specified maintenance periods to provide maintenance until occupancy by SD1.

2. Fall seeding shall be performed between the dates of August 15 and October 1. Spring seeding will be permitted as soon as the ground can be worked to May 31, provided severe drought and high wind conditions do not exist.
3. Other planting schedules may be approved by SD1 upon request.

1.6 ALTERNATIVES

A. Do not make substitutions, unless approved in writing by SD1. . Submit to ENGINEER proof of nonavailability and proposal for use of equivalent material.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil:
1. Topsoil may not be available onsite for landscape/restoration Work. If topsoil is available, it shall be removed and stockpiled prior to trench excavation and kept separate from trench excavation spoils. If topsoil stockpiled is insufficient to complete the Work in this section as specified, or if topsoil is not available onsite, topsoil from approved offsite sources shall be provided. No additional costs will be paid by SD1 for this Work.
2. Provide offsite topsoil as required, which is fertile, friable, natural loam, surface soil, capable of sustaining vigorous plant growth, free of any admixture of subsoil, clods of hard earth, plants or roots, rocks, sticks or other extraneous material harmful to plant growth. Supply topsoil with the following analysis:

a. No. 10 Sieve: 95 to 100 percent passing by weight.
No. 270 Sieve: 40 to 85 percent passing by weight.
Silt (0.05 – 0.005 mm): 20-65 percent passing by weight
Clay (passing 0.005 mm): 10-35 percent passing by weight.
b. pH 5.0 to pH 7.5. If approved by ENGINEER, natural topsoil not having the hydrogen ion value specified may be amended by CONTRACTOR at his own expense.
c. Organic content not less than 5 percent and no more than 20 percent, as determined by ignition loss.
d. Free of pests and pest larvae.

B. Commercial Fertilizers:
1. Complete fertilizer of neutral character, with a minimum of 75 percent nitrogen derived from natural organic sources or ureaform; 40-50 percent of the nitrogen shall be water soluble. Available phosphoric acid derived from superphosphate, bone, or tankage. Potash derived from muriate of potash, containing 60 percent potash. Uniform in composition, free-flowing and suitable for application with approved equipment. Provide fertilizer with the following percentages of available plant nutrients:
a. For grass apply only at a rate sufficient to supply 1 pound phosphoric acid and not less than 1.5 pounds potassium, and provide not less than .75 pounds of actual nitrogen per 1000 square feet of lawn area. For 18-24-12 with 25% SCU use 7 pounds per 1000 square feet.

D. Grass Materials:
1. Grass Seed Mixture: Provide fresh, clean, newcrop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.
2. The seed shall comply with seed laws and noxious weed restrictions in strict accordance with the standards of the American Association of Nurserymen as set forth in the latest edition of American Standard for Nursery Stock, ANSI-Z60.1. Seed shall also meet the requirements for purity and germination as specified in the Proceedings of the Association of Official Seed Analysis, Rule for Testing Seeds.
3. Seed shall be furnished in sealed standardized containers of the vendor bearing the date of last germination, which shall be within a period of 6 months prior to planting. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable.
4. The Schedule of Grass Seed Requirements is as follows. One of the following mixes shall be used:

SCHEDULE OF GRASS SEED REQUIREMENTS

MIX #1 (For shaded lawn areas only)

Application By Weight	Name of Grass	Purity	Germination	per 1000 square feet
60% pounds (minimum)	Kentucky Bluegrass Blend * Poa pratensis	95%	80%	1.8
20% pounds (minimum)	Chewings Red Fescue Festuca rubra commutata	97%	85%	.6
20% pounds	Certified Pennfine Rye Grass Lolium perenne	98%	90%	.6
pounds				3.0

MIX #2

Application By Weight	Name of Grass	Purity	Germination	per 1000 square feet
29.90% pounds	Crew Cut Tall Fescue	95%	94%	2.4
29.90% pounds	Tulsa Tall Fescue	95%	94%	2.4
19.95% pounds	Grande Tall Fescue	95%	94%	1.6
19.30% pounds	ICE Perennial Ryegrass	95%	91%	1.6
pounds				8.0

MIX #3 –

Application By Weight	Name of Grass	Purity	Germination	per 1000 square feet
29.52% pounds	Stetson Tall Fescue	95%	94%	2.4
29.42% pounds	Legitimate Tall Fescue	95%	94%	2.4
29.32% pounds	Padre Tall Fescue	95%	94%	2.4
9.74% pounds	Evening Shade Perennial Ryegrass	95%	91%	0.8
pounds				8.0

MIX #4 – Riparian and Natural Areas

By Weight	Name of Grass	Purity	Germination	Application per 1000 square feet
27%	Annual Rye	95%	90%	0.14 pounds
9%	Creeping Red	95%	85%	0.05 pounds
18%	Canada Wild Rye	70%	75%	0.09 pounds
18%	Riverbank Wild Rye	70%	75%	0.09 pounds
5%	Indian Grass	70%	75%	0.02 pounds
5%	Big Blue Stem	70%	75%	0.02 pounds
9%	Little Blue Stem	70%	75%	0.05 pounds
5%	Fox Sedge	90%	75%	0.02 pounds
5%	Frank's Sedge	90%	75%	0.02 pounds
				0.51 pounds

5. The following requirements apply to all mixes:
   a. Weed seed content not over 0.25 percent and free of noxious weeds.
   b. Provide bluegrass blend consisting of half of each of the following:
      1) Adelphi.
      2) Glade.
   c. All seed shall be rejected if the label lists any of the following grasses:
      1) Timothy.
      2) Orchard.
      3) Sheep Fescue.
      4) Meadow Fescue.
      5) Canada Blue.
      6) Alta Fescue.
      7) Bent Grass.

H. Miscellaneous Landscape Materials:
   1. Mulch: Provide clean, seedfree salt hay or threshed straw of wheat, rye, oats or barley, free from noxious weeds.
   2. Water: Potable.

PART 3 – EXECUTION

3.1 RESTORATION

A. CONTRACTOR shall restore all areas disturbed by construction activity as the Work progresses. During construction, no more than 500 feet of length as measured along the pipeline shall be left non- Permanently or Temporarily Restored after pipeline construction in the area is complete. Temporarily restoring areas will only be permitted when site conditions are such that Permanent Restoration cannot be accomplished as described in Section 02900 1.5. Job Conditions. Areas that are Temporarily Restored shall be restored with Mulch and Annual Rye or Winter Wheat.

B. Failure to provide restoration and landscaping as the work progresses and as specified herein to SD1's satisfaction may be grounds for non-approval of the CONTRACTOR's applications for payment.

C. All areas of the project site disturbed by construction activities shall comply with the sediment and erosion control requirements of SD1 and as shown on the drawings. These requirements shall be in addition to the restoration requirements specified herein.

3.2 INSPECTION

A. CONTRACTOR and his installer shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify ENGINEER of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.3 PREPARATION

A. Seed Turfbed Preparation:
   1. Loosen subgrade of turfbed areas to a minimum depth of 4 inches. Remove from the site stones over 1inches in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation. Lose stone shall be removed by utilization of a mechanical device designed for removing loose rock or stone.
   2. Spread topsoil to a minimum depth of 6 inches after natural settlement and light rolling.Grade turfbed areas to smooth, even surface with loose, uniformly fine texture.
      a. Do not spread topsoil while in a frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or clods will not break readily.
   3. Apply commercial fertilizers in the following quantities:
      a. For grass apply only at a rate sufficient to supply 1 pound phosphoric acid and not less than 1.5 pounds potassium, and provide not less than .75 pounds of actual nitrogen per 1000 square feet of lawn area. For 18-24-12 with 25% SCU use 7 pounds per 1000 square feet

5. Apply commercial fertilizers during seeding operations.
6. Restore turfbed areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.4 INSTALLATION

A. Determine location of underground utilities and perform Work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned.

B. CONTRACTOR shall provide all materials, labor, and equipment to complete all seeding work.

C. Seeding Lawns:
1. Sow seed using a spreader or seeding machine.
2. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
3. Sow not less than the quantity of seed specified.
4. Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations.
   a. Spread uniformly to form a continuous blanket not less than 11/2 inch loose measurement over seeded areas. Provide mulch. Place mulch using either of the following methods:
      1) Place mulch with equipment that will blow or eject, by means of a constant air stream, controlled quantities of the mulch in a uniform pattern over the specified area to achieve 80 to 90 percent of the ground is covered. If the mulch is excessively cut or broken take measures to reduce the cutting or breakage to a limit approved by ENGINEER.
   b) Thru all residential yards mulch must be anchored using either of the following methods:
      1) 2) Anchor mulch in place with a mechanical crimper to incorporate straw mulch into the soil.
      3) A tackifing agent maybe used to glue the mulch together with the soil surface. The tackifier agent shall be selected based on longevity and ability to hold the mulch in place. Apply tackifier at a rate specified by the manufactor.
5. Do not leave seeded areas unmulched for longer than 1 day. Reseed areas which remain without mulch for longer than 1 day.
6. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched area. Reseed areas damaged as a result of such activity.
7. Water seeded areas thoroughly with a fine spray. Watering seed will be the responsibility of the CONTRACTOR until grass has established.

D. Slopes Steeper than 4:1 low maintenance areas:
1. For slopes steeper than 4:1 low maintenance areas, walk bulldozer or other tracked equipment up and down slopes before seeding to create tread-track depressions for catching and holding seed.

2. For slopes steeper than 2:1 install erosion control blankets or turf mates according to manufacturers' recommendations
3. Use seed mix #4 for slopes steeper than 4:1 low maintenance areas.

E. Reconditioning Existing Turf:
1. Recondition existing turf areas damaged by CONTRACTOR'S operations including storage of materials and equipment and movement of vehicles. Also recondition existing turf areas where minor regrading is required.
2. Provide fertilizer, seed or sod and soil amendments as specified for new turf and as required to provide a satisfactorily reconditioned turf. Provide new topsoil as required to fill low spots and meet new finish grades.
3. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.
5. Remove diseased and unsatisfactory turf areas; do not bury into soil. Remove topsoil containing foreign materials resulting from CONTRACTOR'S operations including oil drippings, stone, gravel and other loose building materials.
5. In areas approved by ENGINEER, where substantial turf remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.
6. Water newly planted areas and keep moist until new turf is established.

F. Be prepared to provide potable water and maintain temporary piping hoses and watering equipment as required to convey water from water source and to keep landscape Work moist as required for proper growth. CONTRACTOR shall supply required irrigation materials, equipment and potable water.

G. Any fences, signs, mailboxes, guardrails, shrubs, ornamental landscaping, or other miscellaneous items that need to be removed to facilitate sewer construction operations shall be replaced, in kind or with repairs satisfactory to SD1 at the CONTRACTOR'S expense. Replacement of fences, signs, mailboxes, guardrails, shrubs, ornamental landscaping, or other miscellaneous items shall be considered a part of the sewer installation and shall be done immediately after the installation and backfilling of the sewer. The cost for the removal and replacement shall be included in the contract price bid for restoration.

H. All drainage ditches, culverts, and storm pipes disturbed by the CONTRACTOR'S work shall be restored, reshaped, and graded to drain properly per the contract unit price bid for restoration.

I. Pavement restoration shall be in accordance with the restoration sections on the Standard Detail sheets in the Contract Documents and the provisions of the Governing Agency responsible for the particular road.

3.5 PROTECTION AND MAINTENANCE

A. Begin maintenance immediately after planting.

B. Seeded areas shall be protected against traffic. All seeded areas shall be maintained by the CONTRACTOR until final acceptance of the project. Maintenance shall include watering, reseeding, repair of erosion damage, maintenance of mulch, cleanup and all other operations necessary for the satisfactory development of the grass.

C. Mulch shall be maintained until covered with growing grass seedlings. Material that has been removed from the site by wind or other causes shall be replaced and secured.

D. Original grades of grass areas shall be maintained after commencement of planting operations and until final acceptance. Any damage to the finished surface from construction operations shall be promptly repaired. In the event erosion occurs from either watering operations or rainfall, such damage shall be corrected and areas reseeded where required. Ruts, ridges, tracks, and other surface irregularities shall be corrected and areas reseeded where required.

E. Maintain lawns by watering, fertilizing, ~~weeding, mowing, trimming~~ and other operations such as rolling, regrading, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

1. After grass has started, reseed repeatedly all areas until a uniform density of at least 80 percent grass cover or greater has been achieved , as determined by SD1 .
2. After seeded areas are uniform in color, leaf texture, and shoot density, and reasonably free of weeds, with plants at two inches tall, minimum and a minimum of two grass mowings apply a post-emergent herbicide, including a commercial fertilizers in the following quantities: a rate sufficient to supply 1 pound phosphoric acid and not less than 1.5 pounds potassium, and provide not less than .75 pounds of actual nitrogen per 1000 square feet of lawn area. For 18-24-12 with 25% SCU use 7 pounds per 1000 square feet

F. Prior to final acceptance, seeded areas that show signs of substantial desiccation, as evident by a loss of color and a distinct yellowing or where no germination is evident, shall be considered as failed and shall be reseeded until an acceptable cover is obtained.

3.5 CLEANUP AND PROTECTION

A. During landscape Work, store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.

B. Protect landscape Work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape Work as directed.

C. Remove all rubbish, equipment and rejected materials from the site.

D. Protection includes all temporary fences, barriers and signs and other Work incidental to proper maintenance.

3.6 INSPECTION AND ACCEPTANCE

A. When the landscape Work is completed, including maintenance, ENGINEER will make an inspection to determine acceptability.

B. Where inspected landscape Work does not comply with the requirements, replace rejected Work and continue specified maintenance until reinspected by ENGINEER and found to be acceptable. Remove rejected plants and materials promptly from the project site.

C. Seeded lawns will be acceptable provided all requirements, including maintenance, have been compiled with, and a healthy uniform, close stand of the specified grass is established, free of weeds, bare spots and surface irregularities.

D. Restoration of disturbed areas in a timely manner is a priority. Payments to the CONTRACTOR may be withheld by SD1for the sewer installation if there is poor or untimely restoration.

4.7 GUARANTEE

A. The CONTRACTOR shall guarantee all work and materials for a period of one year after completion of seeding work. All seeded areas shall have a uniform stand of grass in a density acceptable to SD1 during the guarantee period, all turf which dies shall be replaced by and at the expense of the CONTRACTOR. Replacement made under the CONTRACTOR’s guarantee shall be covered by a like guarantee for a period of one year after completion of the replacement.

4.8 SETTLEMENT

A. CONTRACTOR shall be responsible for all erosion and settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.

B. CONTRACTOR shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from ENGINEER or SD1.

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+ + END OF SECTION + +

2.2 DESIGN AND FABRICATION

A. Design round frames and covers to prevent rocking and rattling under traffic.

B. Fabricate castings true to pattern so that component parts fit together.

C. Identification Markings:
   1. Provide markings on all manhole lids.
   2. All manhole lids shall be provided with the words “SANITARY SEWER” across the center of the lid for sanitary manholes and “STORM SEWER” for storm sewer manholes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's printed instructions and approved Shop Drawings.

B. Set castings accurately to required location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Brace temporarily or anchor temporarily in formwork.

+ + END OF SECTION + +

Gravity Sewer Pipe Rehabilitation by Cured-In-Place Pipe Method

Sanitation District No.1 of Northern Kentucky

Part 1 General

1.1 Description of Work

Furnish all labor, material and equipment to provide for the reconstruction of existing sewer pipes using an approved Cured-In-Place Pipe (CIPP) method by forming a new pipe within an existing pipe, which has generally maintained its original shape. This Specification covers the general requirements for the referenced specifications, CIPP manufacturer and installer qualifications, submittal and guaranty guidelines, materials, installation and testing procedures.

1.2 General

Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable. Where discrepancies exist between this specification and referenced product/process standards, this specification shall govern.

1.3 Intent

It is the intent of this specification to provide for the reconstruction of existing sewers by the CIPP method in pipes which have generally maintained their original shape. The CIPP shall provide flow capacity not less than 100% of the original pipe's flow capacity when new. The process is defined as the reconstruction of sewer lines by the installation of a thermosetting resin-impregnated flexible felt-fiber tube coated on one side with an impermeable plastic which is installed into the existing sewer utilizing a hydrostatic head, or air pressure. Curing is accomplished by circulating hot water or the introduction of controlled steam throughout the length of the inverted tube to cure the resin into a hard, impermeable pipe with the plastic coating on the interior surface of the newly formed pipe. The CIPP shall extend the full length of the original pipe segment and shall provide a structurally sound, joint-less, close fitting and corrosion resistant cured-in-place pipe.

1.4 Objective

The primary objective of this section is to rehabilitate those sewers on which failure could be very disruptive and hazardous to public health and, to restore structural integrity to sewers which would be very expensive to repair after failure. The secondary objective of this scope is to reduce the excessive infiltration and inflow of extraneous water into selected sewer segments thereby reducing sewer overflows and the unnecessary treatment and transport costs associated with inflow/infiltration. It is critical that both the Product and the Installer have the ability to meet or exceed all requirements of the Owner.

Part 2 Contractor's General Responsibilities

2.1 Supervision

1. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of SD1 in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

2. At all times during the progress of the Work, Contractor shall assign a competent foreman or crew leader. The foreman or crew leader will be Contractor's representative at any work site and shall have authority to act on behalf of Contractor. All communications given to or received from the competent foreman or crew leader shall be binding on Contractor.

2.2 Labor

1. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform services as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site and represent SD1 in the most professional manner.

2.3 Services, Materials, and Equipment General Requirements

1. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, coordination, permits, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance and completion of the Work.

2. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of SD1. If required by SD1, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

3. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

4. The contractor shall protect, store, and handle the materials during transportation, while on-site and during installation in accordance with manufacturer's recommendations to ensure that they are not damaged.

5. If any materials become damaged before or during installation, they shall be replaced at the contractor's expense before proceeding further.

2.4 Subcontractors, Suppliers, and Others General Requirements

1. Contractor shall be fully responsible to SD1 for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

2. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, supplier, or other individual or entity any contractual relationship between SD1 and any such Subcontractor, supplier or other individual or entity. Nor does anything in the Contract Documents create any obligation on the part of SD1 to pay or to see to the payment of any moneys due any such Subcontractor, supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

3. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

4. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with SD1 through Contractor.

5. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of SD1. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against SD1 and all other individuals or entities identified to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and Subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

2.5 Patent Fees and Royalties General Requirements

1. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of SD1 its use is subject

to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by SD1 in the Contract Documents.

2. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless SD1, and the officers, directors, partners, employees, agents, consultants and Subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

2.6 Permits General Requirements

Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. SD1 shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges, permits, and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. SD1 shall pay all charges of utility owners for connections for providing permanent service to the Work.

2.7 Laws and Regulations General Requirements

1. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, SD1 shall not be responsible for monitoring Contractor's compliance with any Laws or Regulations.

2. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work.

3. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price.

2.8 Taxes General Requirements

Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

2.9 Related Work at Site

1. SD1 may perform other work related to the Project at the Site with SD1's employees or via other direct contracts therefore, or have other work performed by utility owners. Notice will be given to Contractor prior to starting any such other work.

2. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and SD1, if SD1 is performing other work with SD1's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of SD1 and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between SD1 and such utility owners and other contractors.

3. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Section, Contractor shall inspect such other work and promptly report to SD1 in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

Part 3 General Requirements of CIPP

The finished pipe must be such that when the thermosetting resin cures, the total wall thickness will be a homogeneous, monolithic felt and resin composite matrix that will be chemically resistant to withstand internal exposure to domestic sewage. When cured, the CIPP must form a mechanical bond with the host pipe.

3.1 Reference Specifications

Installation and material tests of cured-in-place pipe (CIPP) must meet the minimum requirements demonstrated in the latest revisions of the following ASTM standards:

Test Method of Flexural Properties of Plastics

ASTM F-1216 Standard Practice for the installation of Cured-In-Place Pipe by Inversion Lining

ASTM D-790 **Standard Polyester Resin**
Flexural Strength 4,500 psi

Flexural Modulus 250,000 psi

Enhanced Polyester Resin
Flexural Strength 4,500 psi
Flexural Modulus 400,000 psi

Any approved process shall strictly adhere to this specification with regard to all standards and requirements. Where discrepancies exist, or any latitude is either inferred or interpreted between this specification and ASTM product and process standards, THIS SPECIFICATION SHALL GOVERN.

3.2 Submittals

1. The Contractor shall furnish three (3) copies of the design calculations establishing the structural capabilities, chemical composition, thickness, curing temperature and period, assumptions, and other mechanical properties of the liner system proposed.

2. The Contractor shall furnish three (3) copies of the manufacturer's brochures giving a complete description of the product proposed, its physical and chemical composition, the same for the thermosetting resin or epoxy hardener, the recommended range of curing temperature, period of cure, cool-down procedures and method of installation.

3. Sampling procedures for obtaining representative restrained or plate (for diameters 15-inch and larger), samples of the finished liner.

Part 4 Materials

4.1 Cured-In-Place-Pipe

1. The CIPP material shall be fabricated from materials which, when cured, will be suitable for the environment intended, i.e., resistant to withstand exposure to sewage gases containing normal levels for domestic sewage of hydrogen sulfide, carbon monoxide, carbon dioxide, methane, traces of mercaptan, kerosene, saturation with moisture, dilute sulfuric acid, external exposure to soil bacteria, and any chemical attack which may be due to materials in the surrounding ground. The final product must not deteriorate, corrode, or lose structural strength in any manner that will preclude meeting the expected design life.

2. The structural performance of the inverted cured-in-place pipe must be adequate to accommodate all internal and external loads (live and dead) over its service life. The CIPP liner shall be designed considering the host pipe is fully deteriorated, a prism loading, a soil loading of 120 pcf, a 2.0 factor of safety, a 2-percent ovality, a 5-percent maximum deflection, a 1,000 psi modulus of soil reaction, a 4,500 psi flexural strength, a 3,000 psi tensile strength, a lining enhancement factor (K) of 7 maximum, H-20 live loads where applicable, 50-percent long-term modulus reduction factor and a hydrostatic load beginning at the surface.

4.2 Acceptable Resin Classes

1. The resin class for CIPP installed under this contract shall be either a Standard Polyester or Enhanced Polyester unless otherwise directed by the Sanitation District due to site-specific field conditions and/or design requirements.

4.3 Standard Polyester Resins

1. The resin used shall be high-grade corrosion resistant isophthalic polyester specifically designed for the CIPP being installed. Only premium, non-recycled resin shall be used. The acceptable resin, (Reichhold Polylite® 33420 or approved equal) shall have been tested according to ASTM D2990, D5813, and F1216 by accredited, third-party testing facilities. Results of these tests shall be made available to the Sanitation District upon request. **Proper certification shall be submitted with the Contractor's bid. Failure to provide this documentation may be grounds for disqualification.**

2. The resin must be manufactured under ISO 9002 certified procedures. The resin vendor must be able to reference the corrosion scale with the resin itself having a heat deflection temperature greater than 212 degrees Fahrenheit. Only PREMIUM, NON-RECYCLED resins will be accepted. PET resins or those containing enhancement additives and/or fillers will not be accepted.

4.4 Enhanced Polyester Resins

1. The resin used shall be a corrosion resistant enhanced thixotropic, medium reactivity, high viscosity, and rigid, chemical resistant isophthalic resin. These resins contain a mineral filler to enhance mechanical properties and are specifically formulated for use in the cured-in-place pipe (CIPP) industry. **Proper certification shall be submitted with the Contractor's bid. Failure to provide this documentation may be grounds for disqualification.**

2. The acceptable resin, (Reichhold Polylite® 33420-E or approved equal) shall have been tested according to ASTM D2990, D 5813 and F1216 by accredited third party testing facilities. Results of these tests shall be made available to the Sanitation District upon request.

3. The resin must be manufactured under ISO 9002 certified procedures. The resin vendor must be able to reference the corrosion scale with the resin itself having a heat deflection temperature greater than 224 degrees Fahrenheit. Only PREMIUM, NON-RECYCLED resins will be accepted.

4. The resin shall be shipped directly from the resin manufacturer's facility to the CIPP wet-out facility. The resin shall not be sent to any intermediate mixing facility. Copies of the shipping documents from the resin manufacturer shall be submitted to the Sanitation District indicating dates of shipment, originating and receiving locations

4.5 Quality Assurance

1. In order that the Owner is assured that the specified resin class is used for the duration of the Contract, the following provisions are made part of this specification:

2. The Contractor shall designate a wet-out facility and shall provide wetout liner tubes from this designated facility only. Multiple facilities to supply wet-out liner tubes for the duration of this contract may not be used without prior approval of the Engineer.

3. The Contractor shall place a sampling valve in-line at a point in the resin/catalyst mixing stage so that a sample of non-catalyzed resin may be taken. A second sampling valve shall be placed in-line at a point after the resin/catalyst mixing stage, but prior to catalyzed resin injection into the liner so that a resin sample may be taken. Both sampling valves shall be left in place for the duration of the Contract.

4. The Owner/Engineer shall have the right to inspect the designated wetout facility and draw samples form one or both sampling valves without prior notice to the Contractor for the duration of the Contract.

5. To further assure usage of a specified resin class, the Owner reserves the right to subject resin samples to an infrared analysis (IR Scan). This standard analytical test involves shining a beam of light in the infrared frequency region through a thin sample of subject resin. The frequency of light is then varied across the infrared spectrum. Chemical functional groups present in the resin being analyzed will absorb infrared light as specific frequencies and with characteristic absorption intensities. A spectrum created from the measurement of light transmitted through the sample across the range of infrared frequencies shall be used to determine the resin's chemical fingerprint. An overlaid IR spectrum of the "Acceptable Resin" by class (see sections 4.2, 4.3 and 4.4 of this specification), shall be used as a baseline comparison for the purpose of a resin class test.

6. The Owner/Engineer may perform random Infrared Scans (IR Scans) and/or Composite Burn-offs to insure resin quality and consistency throughout the duration of the Contract and shall be responsible for the cost of IR testing.

4.6 Catalyst Systems

1. The exact mixture ratio of resin and catalyst shall also be submitted. The catalyst system shall be identified by product name. The resin/catalyst ratio shall be approved by the resin manufacturer in writing. The catalyst system shall be made up of a primary catalyst and a secondary catalyst. The primary catalyst shall be Akzo Perkadox 16 or approved equal and shall be added at a maximum of 1% of the resin volume by weight unless otherwise approved by the Engineer. The secondary catalyst shall be Akzo Trigonox or approved equal and shall be added at a maximum of 0.05% of the resin volume by weight unless otherwise approved by the Engineer

2. "Quick-Cure" or accelerated resin systems including those formulated by substantially increasing the amount of catalysts from that specified above, will not be allowed. Resins, catalysts and resin/catalyst mix ratios shall not be changed or altered during this Contract unless specifically approved by the Engineer in writing.

3. Cure schedules for the CIPP shall be submitted to the Engineer for review. The proposed curing schedules/process shall be approved by the resin manufacturer in writing. Cure schedules

shall include specific information on “step curing” procedures, “cooking times”, duration and “cool down” procedures – all to be approved by the resin manufacturer in writing.

4. The resin shall be shipped directly from the resin manufacturer’s facility to the CIPP wet-out facility. The resin shall not be sent to any intermediate mixing facility. Copies of the shipping documents from the resin manufacturer shall be submitted to the Engineer indicating dates of shipment, originating and receiving locations.

5. The Contractor shall submit a Certificate of Authenticity from the resin manufacturer for each shipment to the wet-out facility to include the date of manufacture and Heat Distortion Temperature. This information shall be submitted before the manufacture or installation of any CIPP.

4.7 Liner Tube

1. The tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216. In the event of a discrepancy between the referenced ASTM requirement and this specification, this specification will govern.

2. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular shaped pipe sections.

3. The wet-out tube shall have a uniform thickness that when compressed at installation pressures shall meet or exceed design “finished and installed” thickness.

4. The tube shall be manufactured to a size that when installed shall tightly fit the internal circumference and length of the original pipe. In the event that under-sized pipe is present, liner tube shall be manufactured so that overlap folds or wrinkles do not occur. Allowances shall be made for circumferential stretching during inversion.

5. The outside layer of the tube, before installation, shall have an impermeable polyurethane or polyethylene plastic coating. This coating shall be an impermeable, flexible membrane that shall contain the resin and facilitate monitoring of resin saturation during resin impregnation. This coating shall form the inner layer of the finished pipe and is required for enhancement of corrosion resistance, flow and abrasion properties.

6. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated layers. No material may be included in the tube that may cause de-lamination in the cured liner, and no dry or unsaturated areas or layer shall be evident.

7. The wall color of the interior liner surface after installation shall be a light-reflective color so that a clear, detailed inspection with closed circuit television equipment may be conducted.

8. The outside of the tube shall be marked for distance at regular intervals not to exceed 10 feet. Such markings shall include the Manufacturers name or identifying symbol.

9. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance between manhole sections of the segment to be lined unless otherwise specified. The line lengths shall be verified in the field before impregnation of the tube with resin.

Part 5 CIPP Design

5.1 Liner Thickness

The Contractor shall submit liner thickness calculations to the Engineer for review. The CIPP shall be designed in accordance with the applicable provisions of F1216 and D2412 for "fully deteriorated gravity pipe conditions" and shall meet the following design conditions:

1. AASHTO H-20 Live Load with two trucks passing for CIPP in streets (16,000 lbs.)
2. A soil modulus of elasticity of 1000 psi, soil weight of 120 pounds per cubic foot and a coefficient of friction of K_u'=0.130r.
3. **Standard Polyester** - Short-term flexural modulus of 250,000 psi and long-term modulus of 125,000 psi
4. **Enhanced Polyester** - Short-term flexural modulus of 400,000 psi and long-term modulus of 150,000 psi
5. Safety factor of 2.0 shall be used.
6. Groundwater elevation at the ground surface.
7. Pipe ovality: 2%
8. Poisson ratio of 0.3.
9. Enhancement factor (K) of 7.
10. Service temperature range shall be 40 to 140 degrees

5.2 Minimum Acceptable Pipe Thickness ("Finished and Installed")

1. The Minimum Acceptable Pipe Thickness (Finished and Installed), shall be based on design parameters in section 5.1 Items 1 through 9 of this Specification adjusted for site-specific field conditions and approved by the Engineer in writing prior to tube manufacture.

2. It is the Contractor's responsibility to determine the site specific external loads on the liner and increase or decrease its thickness as required. The Contractor shall submit his proposed plan for ensuring that the finished and installed CIPP meets minimum thickness requirements. The plan shall include detailed inversion procedures to reduce stretching and resin loss and to minimize shrinkage.

3. The contractor shall submit his price proposal based on the appropriate length, size, and existing pipe parameters. The deterioration of sewers is an on-going process. In the event pre-construction inspections reveal the sewers to be in substantially different conditions than those in the design considerations, the contractor shall request such changes in reconstruction liner thickness, supporting such requests with the appropriate design data satisfactory to the Engineer. The deviation, if approved, shall be reflected by the appropriate addition or reduction in the unit cost for that size as agreed to by the Owner/Engineer.

4. Any liner that does not meet the specified strength and/or thickness requirements, regardless of the amount below the specified requirements, shall be corrected by the Contractor in a manner approved by the Engineer at no additional cost to the Owner. The Engineer's decision on how to correct deficient CIPP installations shall be final. Options for correcting deficient liners that will be considered by the Engineer include removing the liner and re-lining the sewer, excavating and replacing the sewer from manhole to manhole, or providing the Owner with a substantial credit. The primary option that will be considered will be to re-line the sewer. Credits will only be authorized for CIPP that does not meet required thickness. If a credit is acceptable to the Owner and Engineer, the credit shall be calculated by multiplying the bid price by the percent that the liner thickness is below the required installed thickness as follows:

Credit = (1 – Installed CIPP thickness/required CIPP thickness)
X bid price

The Contractor shall not assume a credit will be acceptable to the Engineer/Owner in any case.

5. The finished CIPP will provide a uniform smooth, interior wall surface and will have at least 100% of the flow capacity of the original pipe before rehabilitation. In lieu of measurements, calculated capacities may be derived using a Manning "n" coefficient of 0.013 for the original pipe material and a Manning "n" coefficient of 0.011 for a joint-less smooth-wall cured-in-place pipe.

Part 6 Execution

6.1 By-Pass Pumping

1. If the sewers to be rehabilitated under this contract convey both sanitary and storm water flows, it shall be incumbent upon the Contractor to complete the installation of CIPP during a time-frame wherein precipitation shall not impact the work process or prevent normal storm water flow into and along the subject sewers. The Contractor shall in any case provide for the bypass pumping of all flows the host pipe is deemed by the Owner to be capable of carrying.

2. The installation methodology contemplated requires the temporary blocking and back-ups of sewers and sewage. Contractor shall be responsible to limit the extent and duration of such blockages and backups so that overflows and spillage onto public or private property and into storm sewers, waterways, and streets does not occur. In the event that such spillage or overflows do occur during the course of or as a result of the Work, the Contractor performing the Work shall immediately eliminate the spillage or overflow and, as necessary, remove the blockage and eliminate the back-up. On elimination of the spillage or overflow, the Contractor is to clean up and disinfect the area. Work to stop or contain such events is to be deemed EMERGENCY in nature and sufficient justification for total mobilization of resources, the use of overtime or double time, and any other reasonable measures to assure correction of the problem without delay. Damages arising from blockages, back-ups, spillage, or overflows of sewage during the course of the Work or because of the Work shall be the sole responsibility of the Contractor.

3. Sewage flow shall be pumped around segments during CIPP installation, lateral service reinstatement and post-installation closed-circuit television inspection.

4. Pumping equipment shall have the capacity to convey 100% of predicted dry and wet-weather flows for a 2 year design storm. Maps with predicated flows are provided to size bypass pumping systems around the construction area.

The flow shall be intercepted at the upstream end of the construction area and shall be pumped through temporary piping of adequate size. The flow shall be discharged into a manhole on the downstream side of the construction area, thus bypassing the sewer segment(s) under construction. The Contractor shall be required to contact all residential and commercial customers whose service lines connect to the sewer main being bypassed and inform them that they will be temporarily out of service. The Contractor shall also advise those customers against water usage until the mainline is back in service. After completing the necessary work on the main line to allow its reuse, the Contractor shall advise those customers that the sewer main is back in service. Should a condition arise that the Contractor cannot restore service within twelve (12) hours of service interruption; the Contractor shall make provisions for pumping all flows within the service interruption area at no cost to the Owner.

5. A standby pump or pumps of the same capacity shall be required on site.

6. The Contractor is responsible for paying all fines imposed for overflow or spills during construction.

6.2 Cured-In-Place-Pipe Rehabilitation

1. All reconstruction of existing gravity sewer mains using an approved CIPP Product and Installer shall be performed in strict accordance with this Specification and the latest revision of ASTM F1216. Where discrepancies exist, or any latitude is either inferred or interpreted between this specification and ASTM product and process standards, this Specification shall govern.

2. Pull-In and Inflate methods of CIPP installations, (reference ASTM F1743), will not in any case be acceptable.

3. The Contractor shall carry out his operations in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and entry into a confined space.

4. The Contractor will be responsible for locating and accessing all manholes and provide access to water hydrants for cleaning, inversion and other work items requiring water.

5. All surfaces, which have been damaged by the Contractor's operations, shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of the Contractor’s operations. Suitable materials and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period. Compensation for this work will be included in the Contractor’s proposal.

6. The tube shall be fabricated to a size that, when installed, will neatly fit the internal circumference of the conduit(s) designated for CIPP. Allowance shall be made for the circumferential stretching during insertion of the tube. After curing of the resin is completed, the hardened CIPP will extend from manhole to manhole of the section designated providing a structurally sound, corrosion-resistant, watertight conduit that excludes exfiltration and infiltration, is tightfitting within the existing pipe, and is free of voids or annular spaces between the CIPP and the existing pipe walls. K-Factor for tightness shall equal 7.0 or greater. All terminations into manhole walls shall be watertight at the time of final inspection. No annular space shall be visible between the CIPP and manhole wall. In the event that an annular space is present, it shall be completely filled with epoxy or other suitable material to the satisfaction of the Engineer.

7. The Contractor shall be responsible for determining the minimum length to effectively span the distance from the manhole to manhole and shall verify the length of the fabric tube in the field before the tube is either cut to length or wet-out with resin. The tube may run through one or more manholes with the approval of the Owner/Engineer.

6.3 Preliminary Installation Requirements

1. "Normal" Cleaning of Sewers

    a. Sewers shall be cleaned of all debris, roots and other materials that would inhibit proper inversion of CIPP

    b. Utilizing high-pressure jet cleaning equipment, several passes are completed to assure that all debris is removed from the pipe to the satisfaction of the Owner/Engineer.

2. "Heavy" Cleaning of Sewers

If roots are present which require the use of mechanical brushes or dragging devices or, if in the judgment of the Owner/Engineer, the pipe is more than 25% full of debris, the pipe shall be cleaned to the satisfaction of the Owner/Engineer and additional payment authorized under the appropriate Pay Item on the Bid Form. Heavy Cleaning shall be defined as the pipe being more than 25% full of debris or requiring the use of apparatus other than normal high-pressure jetting equipment. The Contractor shall be paid for heavy cleaning on the basis of the distance loosened debris is moved to the nearest point of extrication from the sewer. Payment shall be calculated on a lineal foot basis and will be paid in addition to the normal cleaning rate shown on the Bid Sheet. **Any heavy cleaning must have pre-approval from the Owner/Engineer**.

6.4 Debris Disposal

All debris cleaned from the pipe shall be removed and disposed of at the cost of the Contractor in a dumpsite designated by the Owner. Debris shall not be allowed to wash into any other pipe segment either up or downstream from the pipe segment being cleaned.

6.5 Provision and Usage of Water

The Owner shall provide all water required to perform this Work. The Owner shall provide a fire hydrant meter at no cost to the Contractor beyond the normal security deposit for use on the Project. Contractor shall coordinate connection and usage limits and withdrawal locations with the Owner prior to construction.

6.6 Pre/Post Installation Video Inspection

1. Prior to installation of the CIPP, but not more than 48-hours prior to such installation, the section of sewer designated for CIPP is to be televised its full length using a remote television camera specifically designed for that purpose.

2. Inspection of the sewer pipe shall be performed by the Contractor's experienced personnel trained in location breaks and obstacles by CCTV inspection. Utilizing a color video inspection system with data recording capabilities, the entire pipe section to be lined shall be recorded in a Digital Format and two (2) copies produced. The interior of the pipe shall be carefully inspected to determine the location of any conditions, which may prevent the proper installation of the CIPP, and it shall be noted so that these conditions can be corrected. A DVD/CD-ROM and suitable log shall be submitted to the Owner.

3. Pre and post-installation videos and logs shall be submitted during the course of the Work. The television camera used for this purpose shall be operative in one hundred percent moisture conditions. Lighting for the camera shall be sufficient to yield a clear picture of the entire periphery of the pipe. The camera, television monitor, and other components of the video system shall be capable of producing a five hundred line resolution picture. The camera's rate of travel shall not exceed 20 feet per minute. At each service, the camera shall come to a complete stop and the service shall be panned so that the entire cross sectional area of the service is inspected. The footage meter count shall be clearly visible. Logs shall include date, line size, length, manhole numbers and project number, direction of camera travel, direction of flow, and any observed defects or comments. For each service the log should include the distance from manhole, its location (e.g. 9:00 or 2:00 o'clock), street address or parcel, and distance from mainline to cleanout. Videos between manhole segments shall be continuous; no breaks or "blink-outs" in the video shall be observed. The videos shall be in CD-ROM or DVD format.

4. Sewer service connections shall also be TV inspected from within the sewer main, identifying all service connection locations and conditions. Conditions of service connections shall be noted in the log.

5. The full cross-sectional area of the pipe shall be visible during video inspection except where misalignment of the sewer may have resulted in standing water in bellies or sags.

6. If for any reason the camera becomes disabled inside the sewer and cannot further proceed, the Contractor will be responsible for retrieving the camera at no additional cost to the Owner.

6.7 Identification and Pre-measurement of Lateral Connections

A 360-degree Pan-and-Tilt view camera shall be used to inspect the pipe. At each connection the operator will stop and turn the camera lens toward the lateral thereby inspecting the first 8 to 12 inches of the lateral connection. The Contractor shall be responsible for determining if connection is active or inactive. For each existing service connection determined by the Contractor to be active, the Contractor shall determine the condition of the service connection to the main, make his recommendation for lateral connection repair, and record both items in his log.

6.8 Resin Impregnation of the CIPP Tube (Wet-Out)

The contractor shall designate a location where the tube shall be impregnated or "wet out" with resin, using distribution rollers and a vacuum impregnation system to thoroughly saturate the tube's felt fiber prior to installation in the field. The impregnated tube shall be free of pinholes, resin voids and other defects. If the cured-in-place pipe is impregnated at the manufacturing plant, it shall be delivered to the job site in a refrigerated truck, and remain refrigerated prior to installation to prevent premature curing. The flexible tube shall be vacuum impregnated with resin under controlled conditions or by such other means provided such means can assure thorough resin impregnation to the full satisfaction of the Owner/Engineer. The volume of resin used shall be sufficient to fill all voids in the tube material at normal or design thickness and diameter. The volume of resin shall be adjusted by adding seven to ten percent excess resin for the change in resin volume due to polymerization and allow for any migration of resin into the cracks and joints in the original pipe.

6.9 Inversion of CIPP

1. The preferred method of curing CIPP shall be by circulated water. The use of controlled steam will be considered on a case-by-case basis only. The Contractor shall submit a written request for the use of steam in sewer segments where the Contractor feels that curing by steam will be beneficial to the Sanitation District. The Contractor shall not assume in any case that the use of controlled steam for the curing of CIPP is acceptable to the Sanitation District without prior written authorization from the Sanitation District. This must be done 2 weeks prior to the installation.

2. The impregnated tube shall be inverted through an existing manhole or other approved access point utilizing a hydrostatic water column or pressurized air until it has fully traversed the designated line length and the inversion face breaches the destination manhole or termination point. The fluid column or air pressure shall have been adjusted and maintained to be sufficient to cause the impregnated tube to hold tight against the existing pipe wall, produce dimples at side connections, and flared ends at the manholes. Lubricant during inversion shall be used as necessary in accordance with the CIPP manufacturer's recommendations. Thermocouples shall be placed at the top and bottom interface of both ends of the liner for monitoring temperature during the cure cycle. Care should be taken during tube installation not to over-stress the fabric fiber.

3. When using pressurized air, particular attention should be given to the maintenance of the minimum required "finished and installed" thickness of the CIPP. Before the inversion begins, the tube manufacturer shall provide the minimum air pressure required to hold the tube tight against the host pipe and the maximum allowable pressure so as not to damage the tube. Once

the inversion has started, pressure shall be maintained between the minimum and maximum pressures until the inversion has been accomplished

6.10 Curing - Using Circulated Heated Water

1. A suitable source of heat and water recirculation equipment is required to circulate heated water throughout the pipe. The equipment shall be capable of delivering hot water throughout the inverted tube to uniformly raise the temperature required to affect a cure of the resin.

2. Initial cure will occur during temperature heat-up and is completed when exposed portions of the new pipe appear to be hard and sound and the thermocouples indicate that the temperature is of a magnitude to realize an exotherm or cure in the resin. After initial cure is reached, the temperature should be raised to the post-cure temperature recommended by the resin manufacturer. Post-Cure temperature should be held for a period as recommended by the resin manufacturer, during which time the recirculation of the water and cycling of the heat source to maintain the temperature continues.

3. Prior to any inversion, the Contractor shall provide a Post-Cure Hold Time and Temperature Table. This table shall indicate the minimum time and temperature the inverted tube will be held at in order to achieve desired physical properties. The resin manufacturer shall certify both the time and temperatures presented in the table.

4. Curing must take into account the existing pipe material, the resin system, and the ground conditions (temperature, moisture level, and thermal conductivity of the soil).

6.11 Curing - Using Controlled Steam

1. Suitable steam-generating equipment is required to distribute steam throughout the pipe. The equipment shall be capable of delivering steam throughout the inverted tube to uniformly raise the temperature required to affect a cure of the resin.

2. Initial cure will occur during temperature heat-up and is completed when exposed portions of the new pipe appear to be hard and sound and the thermocouples indicate that the temperature is of a magnitude to realize an exotherm or cure in the resin. After initial cure is reached, the temperature should be raised to the post-cure temperature recommended by the resin manufacturer. Post-Cure temperature should be held for a period as recommended by the resin manufacturer, during which time the distribution and control of steam to maintain the temperature continues.

3. Prior to any inversion, the Contractor shall provide a Post-Cure Hold Time and Temperature Table. This table shall indicate the minimum time and temperature the inverted tube will be held at in order to achieve desired physical properties. The resin manufacturer shall certify both the time and temperatures on the table.

4. The Time and Temperature Table submitted when using steam curing shall be identical to time and temperature hold times when curing with heated, circulated water.

5. Curing must take into account the existing pipe material, the resin system, and the ground conditions (temperature, moisture level, and thermal conductivity of the soil).

6.12 Cool-Down

Cool-down of CIPP shall be in accordance with the manufacturer's recommendations. Care should be taken during the cool-down process so as to minimize shrinkage of the CIPP.

6.13 Lateral Service Reinstatement

After the CIPP has been cured, the existing service connections and laterals shall be reinstated. In general, reinstatement of service connections and laterals shall be accomplished internally, without surface excavation, using a remote control cutting device equipped with a television monitor. Reopened services shall be wire brushed to the satisfaction of the Owner/Engineer. In some cases, remote reinstatement may not be possible. In these instances, reinstatement by conventional methods in accordance with the standard Specifications is acceptable. All connections must be reinstated by at least 95-percent of the original opening.

6.14 Appearance of Finished CIPP

All workmanship and materials will meet the standards of the industry. The finished CIPP shall be continuous over the length of pipe between two manholes and shall be an impermeable, joint-less conduit, free from visual defects such as foreign inclusions, dry spots, pin holes, lifts, or delamination. Wrinkles in the CIPP, (other than minor, longitudinal pressure wrinkles) will not be acceptable. The Owner/Engineer shall determine as to the acceptability of pressure wrinkling with that decision being final. In the event the finished liner does not fit tightly against the original pipe at its termination point(s), the space between the liner and the pipe shall be made watertight, utilizing manhole end seals, Hydro-Tite® gaskets, or approved equal.

6.15 Acceptance Testing of CIPP

1. The Owner/Engineer may, at their discretion, direct the Contractor to collect samples of the cured CIPP for laboratory determination of flexural strength, flexural modulus and wall thickness for each test sample during the execution of this Contract. These three individual analyses shall comprise one completed test. All samples shall be collected per the sampling protocols set forth in ASTM F-1216.

2. Upon notification by the Engineer, the Contractor shall remove one restrained sample of the installed liner at least 12 inches in length for testing. For sewers 15 inches and larger, plate samples may be taken and cured in the same water as the installed CIPP. For each sample taken, the Contractor shall cut and deliver a 1-inch wide representative sample (taken at least 2 inches from the end of the specimen) to the Engineer. The sample delivered to the Engineer shall be labeled and removed from any restraining mold. The Engineer may return such samples to the Contractor for disposal.

3. The tests shall be used to verify that the installed CIPP meets these specifications. CIPP thickness shall be measured in accordance with ASTM D5813. Flexural properties shall be determined per ASTM D790. The Contractor shall label and date all samples and deliver the samples directly to the Owner/Engineer. All testing shall be performed by an independent, ASTM-certified testing laboratory of the Owner/Engineer's designation and at the Owner's expense. Payment to the Contractor shall be withheld pending the Owner/Engineer's acceptance of the CIPP test results.

4. Any liner that does not meet the specified strength and/or thickness requirements, regardless of the amount below the specified requirements, shall be corrected by the Contractor in a manner approved by the Owner/Engineer at no additional cost to the Owner. The Owner/Engineer's decision on how to correct deficient CIPP installations shall be final.

6.16 Traffic Control

The Contractor shall be responsible for traffic control during the course of each phase of the Work. Prior to beginning Work, Contractor shall submit a traffic control plan for each section of Work to the Owner for the review and approval. It is the intent that this Work is to be accomplished with as little disturbance to traffic, private property, and the public as is reasonably possible, consistent with timely completion thereof. The traffic control plan shall reflect such requirements where applicable. Signs, signals, and detours shall conform to the Kentucky Department of Highways & Public Transportation requirements for streets and highways within the jurisdiction of the Sanitation District No. 1 of Northern Kentucky.

Part 7 Television Inspection

1.1 Description

1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform television (TV) inspection of the sewer system. Contractor shall restore the Site to pre-inspection condition at completion of work.

1.2 Definitions

1. TV Inspection: Video inspection conducted before sewer line has been cleaned to determine conditions of the pipe, confirm cleaning, and location of service connections. TV Inspection also includes the pan and tilt inspection of manholes and the inspection of laterals, if required, by launching the camera via a mainline, manhole or cleanout.

1.3 Requirements

1. Contractor shall be aware that this Contract requires work in active sewers and shall follow all federal, state and local requirements for safety in confined spaces.

1.4 Performance Requirements

1. Inspection shall be done one sewer line section (i.e. manhole to manhole) at a time.

2. Quality of inspection recording shall be acceptable to SD1 when viewed on a 24” monitor.

3. Inspection shall be performed by a NASSCO *Pipeline Assessment Certification Program* (PACP) certified operator and shall meet the coding and reporting standards and guidelines as set by PACP. All report annotations, pipe conditions and pipe defects shall be identified properly using PACP codes as defined by or PACP.

1.5 Submittals

1. Submit one copy of Electronic Inspection Reports and TV videos on portable hard drive on a weekly basis. The inspections shall be provided in a tabular spreadsheet or database.

2. Copies of PACP certificates of inspectors completing the work.

3. Submit one copy of the QA/QC reports on portable hard drive.

1.6 Reference Standards

1. NASSCO prepared *Pipeline Assessment and Certification Program* (PACP), Current Edition Reference Manual. This manual includes a standard TV inspection form and sewer condition codes.

1.7 Television Equipment

1. Closed Circuit TV Equipment: Select and use closed-circuit television equipment that will produce a color recording.

2. Pipe Inspection Camera: Produce a video recording using a pan-and-tilt, radial viewing, pipe inspection camera that pans ± 275 degrees and rotates 360 degrees. Use a camera with an accurate footage counter that displays on the TV monitor the exact distance of the camera from the centerline of the starting manhole. Use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised. Provide a lighting system that allows the features and condition of the pipe to be clearly seen. A reflector in front of the camera may be required to enhance lighting in large diameter pipe. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 500-line resolution colored video picture. Picture quality and definition shall be to the satisfaction of SD1.

3. TV Studio: The TV studio is to be contained in an enclosed truck, trailer or van for on-road work. It shall have room and seating for the operator, one District staff member, and at least one standing visitor with the doors closed. The studio shall have air conditioning and heating. Normal operation of all equipment, including the TV camera, monitor, and winches is to be from a control panel in the studio.

4. For off-road work, Contractor shall provide the appropriate vehicle(s) for the terrain in order to access the sewers and allow for proper inspection of the sewers and manholes.

5. Recording: Record all images digitally.

7. Video Capture: Full time live color video files shall be captured for each pipe segment inspected with sound identifying the location and the appropriate defect code. The files shall be stored in industry standard MPEG format viewable from an external hard drive on an external personal computer that utilizes Microsoft Media Player, version 9.0 or higher to view the recording. The MPEG video shall be ISO-MPEG Level 1 (MPEG-1) coding with a resolution of at least 352 pixels (x) by 240 pixels (y) and an encoded frame rate of 29.97 frames per second. System shall perform an automatic disk image/file naming structure to allow saved video/data sections to be saved to a portable hard drive. The video recording shall be free of electrical interference and shall produce a clear and stable image. The digital recordings and inspection data shall be cross-

referenced to allow instant access to any point of interest within the digital recording.

8. Video recording shall include audio location, asset information, and the defect observations related to the inspection of all defects identified during the inspection.

1.8 Television Inspection

1. Televise each sewer line to document the structural and maintenance conditions of the line. The sewer inspections shall be compatible with the SCREAM™ defect coding system for sewers and manholes, which is SD1's standard defect coding system. The Contractor shall use PACP to conduct the sewer inspections. However, the system selected to be used shall be converted by the Contractor to the SCREAM™ code equivalents for use in importing and scoring in our LucityMS database. An example of the conversion from PACP codes to SCREAM™ codes is included with this specification.

   The following data for the defect observations shall be recorded:
   - Observation Data
   - Observation#, unique per line
   - Upstream MH#
   - Downstream MH#
   - Date of inspection
   - Direction of inspection
     1 = upstream to downstream
     2 = downstream to upstream
   - Footage
   - Clock position (1 – 12)
   - Defect/Description (use code or text)
   - Comments

2. In addition to recording the defects for the sewers and manholes, Contractor shall also record the following attribute data as "fields" in their inspections:
   - Upstream MH#
   - Downstream MH#
   - Date of inspection
   - Direction of inspection
     a. 1 = upstream to downstream
     b. 2 = downstream to upstream
   - Length of pipe
   - Diameter/height (inches)
   - Shape (use shape code or text)
   - Material (use pipe material code or text)
   - Pipe width, non-circular (inches)
   - Crew
   - Video number (TV inspection only)
   - Start counter (TV inspection only)

- Comments
- Movie document name (provide extension)
- Depth of each incoming and outgoing pipe measured from the manhole rim, as well as the manhole invert at the upstream and downstream side of the manhole, to the nearest 1/8".
- Cleaned: Yes/No
- Amount of debris removed: cubic yards

3. A NEW inspection shall be started where a manhole, junction, or diversion chamber is located. This includes new manholes, junctions, or diversion chambers identified in the field, but not previously identified in District mapping. Therefore, no manholes, junctions, or diversion chambers shall be at a midpoint of an inspection log, only at the beginning and the end of each inspection. Inspection runs shall begin and end at manholes or junctions unless an obstruction is encountered. Lateral connections from inlets/catch basins, material changes or breaks in grade are not approved locations to begin/end an inspection. Said features shall be logged on the recording. If Contractor uses a lateral connection from inlets/catch basins, material changes or breaks in grade as a begin/end point for televising, District will reject said segment and the sewer data shall be reorganized to match the data requirements at no additional cost to SD1.

4. It is critical to obtain maintenance and structural grade for each pipe, therefore the Contractor shall not clean the pipe prior to inspection, unless there is an obstruction that could block the progress of the camera. Upon completion of the sewer inspection, a maintenance score shall be determined. If the sewer scores a 3 or higher using the PACP method, the pipe shall be cleaned immediately after the inspection is completed and this cleaning shall be noted along with the score in the inspection. All debris removed shall be measured by cubic yard and reported for each pipe segment from Manhole to Manhole. After the cleaning is completed the pipe shall be televised to confirm that it has been cleaned properly and all debris has been removed. This inspection shall be per the PACP codes and logged as a separate inspection record for the pipe.

   If the Contractor encounters a removable obstruction, such as debris, roots, etc., that blocks the progress of the camera; SD1 shall be notified immediately. The Contractor shall record this obstruction in the inspection. The Contractor shall be responsible for any cleaning (i.e. root sawing, jetting, etc.) that may be required to remove the obstruction in order to complete the inspection. Contractor shall complete the inspection of the remainder of the pipe after the obstruction is removed as part of the original inspection record. The Contractor will be responsible for any pipe damaged due to the use of a cleaning procedure that could have reasonably been expected to present a significant risk of pipe damage or collapse.

   If an obstruction is encountered that is not removable and not passable with the camera, such as a broken or collapsed pipe, SD1 shall be notified immediately. The Contractor shall record this obstruction in the inspection. It is expected, however, that if a collapsed pipe, or any other type of impassible structural defect, is encountered within a section of pipe, that this defect will be approached from both the downstream and upstream directions in order to capture inspection data on the most pipe length available. SD1's crews will be responsible for repairing the obstruction. The Contractor may be required to re-inspect the sewer once

the repair is complete and will be paid according to the terms outlined in this contract. SD1's crews will re-inspect the sewer upon completion of the repair.

5. Notify SD1 on a weekly basis or each day, as needed, where the Contractor will be working in advance of any TV inspection so that SD1 staff knows the locations of the Contractor's crews and may observe inspection operations.

6. Inspections shall be from center of the starting manhole to the center of the ending manhole. Distances along the pipe should be measured from the center of the manhole. Measurement meters shall be accurate to the nearest foot per 100 feet of sewer being televised within the particular section of pipe (section of pipe being defined as the length of pipe between the upstream and downstream MHs). Measurement meters shall be accurate to two-tenths of a foot over the entire length of the sewer line section being inspected. Prior to recording the location of defects and service connections, slack in the cable of the television inspection camera shall be taken up to ensure metering device is designating proper footage. Accuracy of the measurement meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device.

7. Center the camera in the middle of the pipe.

8. Move the camera through the line (in the downstream direction whenever possible) at a uniform rate not to exceed 30 feet per minute. The intent is to perform the inspection per the PACP standards. It may be necessary for a lower rate of speed depending on the defects encountered.

9. Stop at every defective joint for three seconds using a pan and tilt view. When appropriate, stop elsewhere for a length of time long enough to ensure proper documentation of the sewer's structural and maintenance conditions. Pan and tilt to observe and document areas of apparent deteriorated pipe surface.

10. Stop at every lateral connection. Center the camera so that the lighting and the pan and tilt view can be used to inspect as far into the lateral connection as possible. Record all defects found in the service connection. Observe top, bottom and sides of lateral connections. Where lateral flow is observed, observe flows from service connections for a length of time long enough to ascertain if the flow is sanitary or extraneous flow. The video recording may be paused during observation. Record results of the flow observed on the inspection. The inspection of the service lateral is not to be performed and will not be paid for as part of this RFP unless explicit direction is given by SD1 to perform such work.

11. Use manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions to move the camera through the sewer line.

12. TV inspection recordings shall be continuous for each pipe segment and include sound identifying the location and type of defect.

13. Contractor is responsible for adjusting light levels, cleaning fouled or fogged lens, and allowing vapor to dissipate from camera lights in order to produce acceptable recordings.

SD1 will not pay for unacceptable CCTV video footage that does not clearly identify the type of defects present in the sewer pipeline.

14. Sewer inspections not meeting the requirements set forth in this specification as determined by SD1 shall be re-performed at no additional cost to SD1 until the inspection meets to SD1's satisfaction.

15. If a lateral inspection is required and a Contractor finds a defective lateral connection in which a lateral inspection cannot be completed, contact SD1 immediately. Contractor must make 3 attempts to inspect the lateral.

1.9 Flow Control

1. Adequately control the flow in the section being televised. Plugging of the flows may be used to accomplish this. Recordings made where the depth of wastewater flow shown below is exceeded will be rejected:

Pipe Diameter (Inches)	Depth of Flow (Percent of Pipe Diameter)
6-10	50
12-24	30 Over 24
	30

It is not expected for the Contractor to provide bypass pumping if the depth of flow listed above is exceeded and TV inspection during minimum flow hours does not result in depths meeting the above requirements. In these cases, SD1 shall be notified and a note in the inspection log shall be provided indicating "Depth of flow exceeds requirements." If it is determined that a sewer segment requires by-pass pumping, by-pass pumping may be performed in accordance with a negotiated amendment to the Contract as directed by SD1.

See Item 4 below.

2. Whenever flows in a sewer line are blocked, or plugged, sufficient precautions must be taken to protect the sewer lines from damage that might be inflicted by excess sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause overflows, flooding or damage to public or private property being served by the sewers involved. No overflows are permitted. Contractor is responsible for all damages.

3. Contractor is responsible for all damages to owned and operated equipment, District facilities, and privately owned facilities caused by malfunctioning plugs, pumps or other Contractor-owned or operated equipment. In the event of a failure or malfunction of Contractor equipment, Contractor is responsible for all work necessary to restore facilities to pre-contraction condition including but not limited to excavation and restoration of sewer lines and roadways required to retrieve malfunctioning cameras, plugs, and hoses.

4. It is anticipated that portions of the sanitary sewer are bowed or bellied and as a result the camera will be submerged. Wherever the camera encounters a submerged condition, or where the wastewater flow depth exceeds the maximum allowable, reduce the flow depth to an

acceptable level by performing the survey TV inspection during minimum flow hours, or by pulling a camera with swab, high-velocity jet nozzle or other acceptable dewatering device. Contractor can request cleaning costs as a result of this depth reduction in accordance with the cleaning specification 02760. Recordings made while floating the camera are not acceptable unless approved by SD1.

1.10 Passage of TV Camera

1. If during TV inspection of a pipe segment, the camera is unable to pass an obstruction even though flow is unobstructed, televise the pipe segment from the opposite direction in order to obtain a complete recording of the line. Contractor shall also measure the distance between the manholes (centerline to centerline) with a tape or wheel to accurately determine the total length of the manhole segment. See additional requirements in 3.1 above.

1.11 QA/QC Analysis

1. The selected Contractor will be provided a copy of SD1's sewer and manhole GIS and database to use as a guide when conducting the inspections. The Contractor shall perform a QA/QC analysis on all sewer and manhole data recorded before the data is submitted to SD1. The Contractor shall provide a summary report of the results of the QA/QC analysis. The QA/QC verification items shall be compared to SD1's database and shall include, but not necessarily be limited to, the following:
    - Deviations of five feet or greater
    - Any missing or mislabeled sewer or manhole attribute data.
    - Confirmation that applicable continuous defects have a recorded defect length.
    - Any missing or mislabeled attribute or defect data supposed to be recorded for both sewers and manholes.
    - Verification that all necessary defect data is present so that a SCREAM™ sewer and manhole score can be calculated.

1.12 INSPECTION DELIVERABLES

1. The inspections shall be provided in a tabular spreadsheet or database.

2. The attribute and inspection data, CCTV video, and the QA/QC analysis, shall be submitted weekly via portable hard drive. These weekly submissions shall be for one week's worth of work from the two prior weeks. The intent is to give the Contractor the first week to gather all data, the second week to perform the QA/QC analysis and assemble all of the data, and then deliver the portable hard drive with all information to SD1 on the Monday of the third week. See REPORTING below.

3. The CCTV videos shall be provided as specified in Item 2.1.F for easy import into SD1's Asset Management Software.

4. All inspections and videos shall be divided into separate files for each manhole to manhole segment and each manhole and shall be labeled based on SD1's manhole numbering system for easy linkage to SD1's asset management database.

5. Digital Inspection Recordings
    1. Provide digital inspection recordings. Inspection recordings must be viewable on a standard 16" computer monitor.
    2. Recording shall be of a quality sufficient for SD1 to evaluate the condition of the sewer and manholes, locate the sewer service connections, and verify cleaning. If SD1 determines that the quality is not sufficient, Contractor shall re-televise the sewer segment and/or re-inspect the manhole and provide a new recording and report at no additional compensation. Camera distortions, inadequate lighting, dirty lens, or blurred/hazy picture will be cause for rejection Payment for inspection of the sewer and manholes shall not be made until SD1 approves the inspections, re-inspections as required, videos, pictures, and QA/QC reports.
    3. Multiple project areas may be included on a given hard drive, but the files must be organized in individual project folders. TV Inspection recordings shall not be edited. Each pipe segment must be its own electronic file. Electronic recording file must allow snap scrolling to allow easy and quick access of the entire recording.
    4. Each hard drive must have a file index whose name contains the pipe segment reference number.
    5. Contractor shall maintain a master copy of all recordings and Inspection Reports submitted, for two years after delivery of inspections reports and recordings.
    6. Label each hard drive with the following information:
        a. Pipe Segments
        b. Contractor's Name
        c. Project Name
        d. Contract Number
        e. Inspection Type: Downstream of SSO, within 50' of creek, Phase 1 priority basin, as-needed inspection
        f. Date Televised

1.13 Supplements

A. Example of the conversion from PACP codes to SCREAM™ codes may be obtained from SD1.

Part 7 Payment for Work

Payment for Cured-In-Place pipe shall be based on the unit prices per linear foot by size of sewer, complete in place, as shown on the Bid Pricing Form. The unit bid price shall be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

END OF SECTION

N O T I C E

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NATIONWIDE #14 PERMIT AUTHORIZATION
KENTUCKY DIVISION OF WATER 401 WQC

9-12-2022

PROJECT: Kenton County, Item No. 6-8916
EXTEND HOUSTON ROAD TO CINEMA PROPERTY

The Section 404 & 401 activities for this project have been previously permitted under the authority of the Department of the Army Nationwide Permit No. 14 "Linear Transportation Projects" & Division of Water General Water Quality Certification. In order for these authorizations to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Permit & General WQC in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

Station 40+00 Sheet R5	Place an ephemeral stream/ditch into a 15 inch pipe. The **ephemeral** stream a U.T. to Viox Creek will have impacts below the normal high water mark. The estimated area of impact is **110 linear feet** and **0.005 acres**.
Station 42+25 Sheet R7	Extend a double 12'X10' reinforced concrete box culvert. The **perennial** stream Dry Creek will have impacts below the normal high water mark. The estimated area of impact is **90 linear feet** and **0.05 acres**.
Station 42+75 Sheet R7	Place an ephemeral stream/ditch into a 24 inch pipe. The **ephemeral** stream a U.T. to Viox Creek will have impacts below the normal high water mark. The estimated area of impact is **120 linear feet** and **0.006 acres**.

This project involves work near and/or within Jurisdictional Waters of the United States as defined by the United States Army Corps of Engineers and therefore requires a Nationwide 14 General 404 Permit. The Division of Water certified this General Permit with several conditions (See attached). One that should be brought to your attention is regarding the use of heavy equipment in the stream channel. If there is need to cross the stream channel with heavy equipment or conduct work from within the stream channel a working platform or temporary crossing is authorized. This should be constructed with clean rock and sufficient pipe to allow stream flow to continue unimpeded (see attached typical drawing).

In order for this authorization to be valid, the attached conditions must be followed. The

contractor shall post a copy of this Nationwide Approval in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

To more readily expedite construction, the contractor may elect to alter the design or perform the work in a manner different from what was originally proposed and specified. Prior to commencing such alternative work, the contractor shall obtain **written** permission from the Division of Construction and the Division of Environmental Analysis. If such changes necessitate further permitting then the contractor will be responsible for applying to the Army Corps of Engineers and the Kentucky Division of Water (KDOW). A copy of any request to the Corps of Engineers or the KDOW to alter this proposal and subsequent responses shall be forwarded to the Division of Environmental Analysis, DA Permit Coordinator, for office records and for informational purposes.

ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

ANTHONY R. HATTON
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

General Certification--Nationwide Permit # 14
Linear Transportation Projects

This General Certification is issued **December 18, 2020**, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this General Certification and all General Certifications of Nationwide Permits (NWP), the term 'surface water' is defined pursuant to 401 KAR Chapter 10, Section 1(72): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the Commonwealth.

As required by 40 CFR Part 121 – State Certification of Activities Requiring a Federal License or Permit, all conditions include a statement explaining why the condition is necessary to assure that any discharge authorized under the general permit will comply with water quality requirements and a citation to federal, state, or tribal law that authorizes the condition. The statements and citations are included with each condition. The statements are written entirely at the end of the certification under the section *Statements of Necessity*.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 303, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 14, namely Linear Transportation Projects, provided that the conditions in this certification are met. Activities that do not meet the conditions of this General Certification require an Individual Section 401 Water Quality Certification.

General Certification--Nationwide Permit # 14
Linear Transportation Projects
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1. Activities occurring within surface waters assessed by the Kentucky Division of Water as designated Outstanding State Resource Waters, National Resource Waters, Cold Water Aquatic Habitat, Exceptional Waters, or identified as candidate Outstanding State Resource Waters or candidate Exceptional Waters are not authorized under this General Certification and require an Individual Certification. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(1), Section 1(2), & Section 1(3); and 401 KAR 10:031, Section 4(2) & Section 8]

2. Activities impacting surface waters assessed by the Kentucky Division of Water as impaired for warm water or cold water aquatic habitat where the parameter or source is related to habitat* are not authorized under this General Certification and require an Individual Certification. [Statement B and citations KRS 224.70-110 and 401 KAR 10:031, Section 2 & Section 4]

   *These include waters impaired by the parameter 'habitat assessment', 'combined biota/habitat bioassessment' or any parameter from the parameter group 'habitat alterations, and/or waters where the parameter identified as a cause of impairment has a source from the source group 'habitat impacts'.

3. Activities impacting surface waters assessed by the Kentucky Division of Water as full support for warm water or cold water aquatic habitat are not authorized under this General Certification and require an Individual Certification. [Statements A and B and citations KRS 224.70-110 and 401 KAR 10:031, Section 2 & Section 4]

4. The activity will not occur within surface waters identified as perpetually-protected mitigation sites (e.g., deed restriction or conservation easement). [Statement C and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3); and 40 C.F.R. 230.97]

5. Activities with cumulative temporary and permanent impacts greater than 1/2 acre of wetland or 300 linear feet of surface waters are not authorized under this General Certification and require an Individual Certification. This General Certification shall not apply to projects where multiple Nationwide Permits are issued for individual crossings which are part of a single, larger transportation projects. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

6. For complete linear transportation projects, all impacts shall not exceed a cumulative length of 500 linear feet within each Hydrologic Unit Code (HUC) 14. [401 KAR 10:030 and 401 KAR 10:031]

7. Stream realignment greater than 100 feet is not authorized under this General Certification and require and Individual Certification. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

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8. Surface water impacts covered under this General Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KAWQP). [Statements A and F and citations KRS 224.71-145(1), 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

9. Any crossings must be constructed in a manner that does not impede natural water flow. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

10. The use of creek rock for bank stabilization; grouted rip-rap; unformed, poured grout; unformed, poured concrete; poured asphalt; or asphalt pieces is not authorized under this General Certification and requires an Individual Certification. Poured concrete or grout will be authorized under this General Certification when contained by tightly sealed forms or cells. Equipment shall not discharge waste washwater into surface waters at any time without adequate wastewater treatments. [Statement A and citations 401 KAR 10:030, Section 1(3)(b) & 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

11. New stormwater detention/ retention basins constructed in surface waters or modifications to stormwater detention/ retention basins resulting in the reduction in reach or that cause impairment of flow of surface waters are not authorized under this General Certification and require an Individual Certification. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

12. Erosion and sedimentation pollution control plans and Best Management Practices (BMPs) must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

13. Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

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14. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering surface waters. [Statements A and D and citations. [KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

15. Removal of riparian vegetation shall be limited to that necessary for equipment access. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

16. To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

17. Heavy equipment (e.g., bulldozers, backhoes, and draglines), if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

18. Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

19. If domestic water supply intakes are located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when such work will be done prior to construction. [Statement E and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

20. Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the Kentucky Division of Water shall be notified immediately by calling (800) 928-2380. [Statement A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

21. The Kentucky Division of Water requires submission of a formal application for any federal applicant that is not required to submit a Preconstruction Notification that would typically be required of any non-federal applicant. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

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22. The Kentucky Division of Water may require submission of a formal application for an Individual Certification for any project that has been determined to likely have a significant adverse effect upon water quality or degrade surface waters so that existing uses of the water body or downstream waters are precluded. [Statement A and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

23. If the final issued General Permit for Nationwide Permit 14 Linear Transportation Projects changes significantly, the Division of Water may opt to deny certification for this permit. [Statements A and D and citations KRS 224.70-110, 401 KAR 10:030, Section 1(3)(b) & Section 1(4)(b); and 401 KAR 10:031, Section 2 & Section 4]

Statements of Necessity:

A. This condition is necessary to protect waters categorized under the anti-degradation policy to protect the designated and existing uses and to maintain the associated water quality criteria necessary to protect these water resources.

B. This condition is necessary to protect existing uses and the level of water quality necessary to protect those existing uses shall be assured in impaired water.

C. This condition is necessary for long-term protection of compensatory mitigation sites.

D. This condition is necessary to provide for the prevention, abatement, and control of all water pollution and to conserve water resources for legitimate uses, safeguard from pollution the uncontaminated waters, prevent the creation of any new pollution, and abate any existing pollution.

E. This condition is necessary to protect domestic water supply use.

F. This condition is necessary to evaluate, develop, and improve best-management practices in conservation plans, compliance plans, and forest stewardship management plans; establish statewide and regional agriculture water quality plans; and otherwise promote soil and water conservation activities that protect surface waters from the adverse impacts of agriculture operations within the Commonwealth.

Violation of Kentucky state water quality standards may result in civil penalties and remediation actions.

For assistance contact the Kentucky Division of Water, Water Quality Certification Section by email (401WQC@ky.gov) or by phone (502)-564-3410.

2021 Nationwide Permit Summary

US Army Corps of Engineers
Louisville District ®

Issued: **February 25, 2022**
Expires: **March 14, 2026**

No. 14. Linear Transportation Projects

(NWP Final Rule, 86 FR 73522)

Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, driveways, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge of dredged or fill material cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge of dredged or fill material cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) The loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge of dredged or fill material in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404).

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges of dredged or fill material for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, ''District Engineer's Decision.'' The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United

States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct

management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district

engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must

include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district

engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not

authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
_____
(Transferee)

_____
_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an

NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many

wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no

work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

E. Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

F. Nationwide Permit Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for an NWP; it is not

a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has surface water flowing continuously year-round during a typical year.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of

the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized jurisdictional stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a "water of the United States." If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).

2021 KENTUCKY REGIONAL GENERAL CONDITIONS

These regional conditions are in addition to, but do not supersede, the requirements in the Federal Register (See volume 86, date January 13, 2021, pp 2867-2874 for the text of Section C, General Conditions).

Notifications for all Nationwide Permits (NWPs) shall be in accordance with General Condition No. 32.

1. For activities that would result in a loss of Outstanding State or National Resource Waters (OSNRWs), Exceptional Waters (EWs), Coldwater Aquatic Habitat Waters (CAHs) and waters with Designated Critical Habitat (DCH) under the Endangered Species Act for the NWPs listed below, a Pre-Construction Notification (PCN) will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs for impacts to these waters.

   NWP 3 (Maintenance)
   NWP 4 (Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities)
   NWP 5 (Scientific Measurement Devices)
   NWP 6 (Survey Activities)
   NWP 12 (Oil or Natural Gas Pipeline Activities)
   NWP 13 (Bank Stabilization)
   NWP 14 (Linear Transportation Projects)
   NWP 15 (U.S. Coast Guard Approved Bridges)
   NWP 16 (Return Water from Upland Contained Disposal Areas)
   NWP 17 (Hydropower Projects)
   NWP 18 (Minor Discharges)
   NWP 19 (Minor Dredging)
   NWP 20 (Response Operations for Oil or Hazardous Substances)
   NWP 22 (Removal of Vessels)
   NWP 23 (Approved Categorical Exclusions)
   NWP 25 (Structural Discharges)
   NWP 30 (Moist Soil Management for Wildlife)
   NWP 32 (Completed Enforcement Actions)
   NWP 33 (Temporary Construction, Access, and Dewatering)
   NWP 36 (Boat Ramps)
   NWP 41 (Reshaping Existing Drainage Ditches)
   NWP 51 (Land-Based Renewable Energy Generation Facilities)
   NWP 57 (Electric Utility Line and Telecommunications Activities)
   NWP 58 (Utility Line Activities for Water and Other Substances)

2. In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25 acres in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

NWP 3 (Maintenance)
NWP 14 (Linear Transportation Projects)

3. Nationwide Permit No. 14 – Linear Transportation Projects.

(a) New road alignments or realignments are limited to a permanent loss of 500 linear feet of intermittent or perennial stream length or the stream bed acreages listed in the table below at each crossing. Road crossings with permanent losses greater than 500 linear feet of intermittent or perennial stream or the stream bed acreages listed in the table below associated with new alignments or realignments will be evaluated as an individual permit (i.e., a Letter of Permission or Standard Permit).

Table of Acreages at Varying Stream Widths for 500 Linear Feet of Impact	
Stream Width (Feet)	Acres of Stream at Varying Widths for 500 Linear Feet of Stream
1	0.011
2	0.023
3	0.034
4	0.046
5	0.057
6	0.069
7	0.080
8	0.092
9	0.103
10	0.115

(b) In addition to the notification requirements contained in NWP 14, the permittee must submit a PCN to the district engineer prior to commencing the activity for the permanent loss of greater than 300 linear feet of stream bed or the stream bed acreages listed in the table below. (See General Condition 32 and the definition of "loss of waters of the United States" in the Nationwide Permits for further information.)

Table of Acreages at Varying Stream Widths for 300 Linear Feet of Impact	
Stream Width (Feet)	Acres of Stream at Varying Widths for 300 Linear Feet of Stream
1	0.007
2	0.014
3	0.021
4	0.028
5	0.034
6	0.041
7	0.048
8	0.055
9	0.062
10	0.069

4. Notification in accordance with General Condition 32 is required to the Corps for all activities located in the following Section 10 waterways, to include the portion of their tributaries below the Ordinary High Water Mark or navigation pool, or otherwise subject to inundation, by the Section 10 waterway:

- Mississippi River
- Ohio River
- Licking River
- Kentucky River
- Salt River
- Green River
- Cumberland River
- Tennessee River
- Big Sandy River (from mouth to Louisa, KY)

5. All applications and requests should be submitted electronically. To submit applications or other requests electronically, all documents should be saved as a PDF document, and then submitted as an attachment in an email to the following email address:

CELRL.Door.To.The.Corps@usace.army.mil

Your email should include the following:
a) Subject Line with the name of the applicant, type of request, and location (County and State). Example: RE: Doe, John, DA Permit Application, Jefferson County, KY
b) Brief description of the request and contact information (phone number, mailing address, and email address) for the applicant and/or their agent.

c) Project Location: Address and Latitude/Longitude in decimal degrees (e.g. 42.927883, -88.362576).

All forms that require signature must be digitally signed or signed manually, scanned and then sent electronically.

Electronic documents must have sufficient resolution to show project details. In order to have the highest quality documents, the original digital documents should be converted to PDF rather than providing scanned copies of original documents.

The electronic application and attached documents must not exceed 10 megabytes (10MB).

6. For all activities, the applicant shall review the U.S. Fish and Wildlife Service's IPaC website: http://ecos.fws.gov/ipac to determine if the activity might affect threatened and/or endangered species or designated critical habitat. If federally-listed species or designated critical habitat are identified, a PCN in accordance with General Condition 18 and 32 would be triggered and the official species list generated from the IPaC website must be submitted with the PCN.

Further information:

Outstanding State or National Resource Water (OSNRWs), Exceptional Waters (EWs), and Coldwater Aquatic Habitat Waters (CAHs) are waters designated by the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet. The list can be found at the following link: http://eppcapp.ky.gov/spwaters/

Designated Critical Habitat (DCH) under the Endangered Species Act is determined within the Commonwealth of Kentucky by the U.S. Fish and Wildlife Service. The current list of Kentucky's Threatened, Endangered, and Federal Candidate Species can be found at the following link: http://www.fws.gov/frankfort/EndangeredSpecies.html

Information on Pre-Construction Notification (PCN) can be found at NWP General Condition No. 32 in the Federal Register (See volume 86, date January 13, 2021, pp 2867-2874 for the text of Section C, General Conditions).

COORDINATING RESOURCE AGENCIES

Chief, Wetlands Regulatory Section
U.S. Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Supervisor
U.S. Fish & Wildlife Service
JC Watts Federal Building, Room 265
330 West Broadway
Frankfort, Kentucky 40601

Supervisor
401 Water Quality Certification
Kentucky Division of Water
300 Sower Boulevard, 3rd Floor
Frankfort, KY 40601

Commissioner
Department of Fish and Wildlife Resources
#1 Sportsman's Lane
Frankfort, KY 40601

Executive Director and State Historic Preservation Officer
Kentucky Heritage Council
410 High Street
Frankfort, KY 40601

Kentucky Transportation Cabinet

Highway District 6

And

_____(2), Construction

Kentucky Pollutant Discharge Elimination System Permit KYR10 Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

Extend Houston Road to Cinema Property

Project: PCN ## - #### Item 06-8916.00

KyTC BMP Plan for Project PCN ## -

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

1. Owner – Kentucky Transportation Cabinet, District 6

2. Resident Engineer: (2)

3. Contractor name: (2)
   Address: (2)

   Phone number: (2)
   Contact: (2)
   Contractors agent responsible for compliance with the KPDES permit requirements (3):

4. Project Control Number (2)

5. Route (Address) Houston Road, Erlanger, KY 41018

6. Latitude/Longitude (project mid-point) dd/mm/ss, dd/mm/ss 39^01'50" north, 84^36'53" west

7. County (project mid-point) Kenton County

8. Project start date (date work will begin): (2)

9. Projected completion date: (2)

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

A. Site description:

1. Nature of Construction Activity (from letting project description) Roadway Reconstruction

2. Order of major soil disturbing activities (2) and (3)

3. Projected volume of material to be moved 5,945 Cubic Yards

4. Estimate of total project area (acres) 1.5 Acres

5. Estimate of area to be disturbed (acres) 1.5 Acres

6. Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information. 0.3

7. Data describing existing soil condition (2)

8. Data describing existing discharge water quality (if any) (2)

9. Receiving water name, Unnamed Tributary to Dry Creek

10. TMDLs and Pollutants of Concern in Receiving Waters: (1 DEA)

11. Site map – Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.

12. Potential sources of pollutants:

The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. (3)

B. Sediment and Erosion Control Measures:

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

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

2. Following award of the contract, the contractor and resident engineer will annotate the erosion control sheets showing location and type of BMPs for each of the DDAs that will be disturbed at the outset of the project. This annotation will be accompanied by an order of work that reflects the order or sequence of major soil moving activities. The remaining DDAs are to be designated as “Do Not Disturb” until the contractor and resident engineer prepare the plan for BMPs to be employed. The initial BMP’s shall be for the first phase (generally Clearing and Grubbing) and shall be modified as needed as the project changes phases. The BMP Plan will be modified to reflect disturbance in additional DDA’s as the work progresses. <u>All DDA’s will have adequate BMP’s in place before being disturbed.</u>

3. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:

   - Construction Access – This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with gravel and temporary mulch and/or vegetation.
   - At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.

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

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

- Permanent Seeding and Protection
- Placing Sod
- Planting trees and/or shrubs where they are included in the project

➢ BMP's including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMP's to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are : N/A

C. Other Control Measures

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

2. Waste Materials

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

3. Hazardous Waste

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

4. Spill Prevention

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

➢ **Good Housekeeping:**

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

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

➢ **Hazardous Products:**

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

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

The following product-specific practices will be followed onsite:

➢ **Petroleum Products:**

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

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

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

- **Fertilizers:**

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

- **Paints:**

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

- **Concrete Truck Washout:**

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

- **Spill Control Practices**

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

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

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

D. Other State and Local Plans

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

E. Maintenance

1. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.

- Maintenance of BMPs during construction shall be a result of weekly and post rain event inspections with action being taken by the contractor to correct deficiencies.

- Post Construction maintenance will be a function of normal highway maintenance operations. Following final project acceptance by the cabinet, district highway crews will be responsible for identification and correction of deficiencies regarding ground cover and cleaning of storm water BMPs. The project manager shall identify any BMPs that will be for the purpose of post construction storm water management with specific guidance for any non-routine maintenance.

F. Inspections

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

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

G. Non – Storm Water discharges

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

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

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

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

H. Groundwater Protection Plan (3)

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

- Contractors statement: (3)

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

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

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

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

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

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

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

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

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

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

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

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

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

KyTC BMP Plan for Project PCN ## -

Contractor and Resident Engineer Plan certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Resident Engineer and Contractor Certification:

(2) Resident Engineer signature

Signed _____title_____, _____
Typed or printed name[2] signature

(3) Signed _____title_____, _____
Typed or printed name[1] signature

1. Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

2. KyTC note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Project Control Number (PCN) and KPDES number when one has been issued.

Sub-Contractor Certification

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

Subcontractor

Name:
Address:
Address:

Phone:

The part of BMP plan this subcontractor is responsible to implement is:

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System permit that authorizes the storm water discharges, the BMP plan that has been developed to manage the quality of water to be discharged as a result of storm events associated with the construction site activity and management of non-storm water pollutant sources identified as part of this certification.

Signed _____title_____, _____
Typed or printed name[1] signature

1. Sub Contractor Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

SPECIAL NOTE

Filing of eNOI for KPDES Construction Stormwater Permit

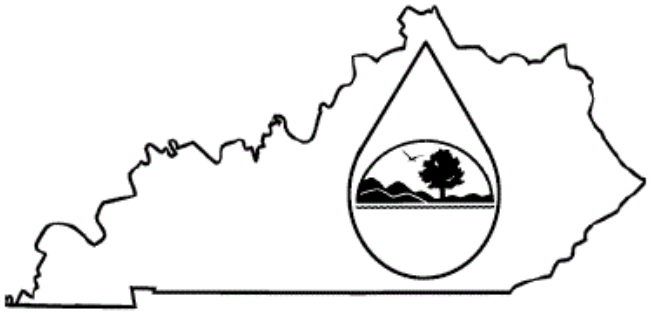
County: Kenton
Item No.: 6-8916.00

Route: CS 3000
KDOW Submittal ID:
e782eb27-9858-4953-8c97-57fb00d7b7b3

Project Description: Houston Road Extension to Cinema Property

A Notice of Intent for obtaining coverage under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Stormwater Discharges Associated with Construction Activities (KYR10) has been drafted, copy of which is attached. Upon award, the Contractor will be identified in Section III of the form as the "Building Contractor" and it will be submitted for approval to the Kentucky Division of Water. The Contractor shall be responsible for advancing the work in a manner that is compliant with all applicable and appropriate KYTC specifications for sediment and erosion control as well as meeting the requirements of the KYR10 permit and the KDOW.

If there are any questions regarding this note, please contact Danny Peake, Director, Division of Environmental Analysis, TCOB, 200 Mero Street, Frankfort, KY 40622, Phone: (502) 564-7250.



KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)

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

Click here for Instructions
(Controls/KPDES_FormKYR10_Instructions.htm)

Click here to obtain information and a copy of the KPDES General Permit.
(http://dep.ky.gov/formslibrary/Documents/KYR10PermitPage.pdf)

(*) indicates a required field; (✓) indicates a field may be required based on user input or is an optionally required field

Reason for Submittal:(*)	Agency Interest ID:	Permit Number:(✓)
	Agency Interest ID	KPDES Permit Number

If change to existing permit coverage is requested, describe the changes for which modification of coverage is being sought:(✓)

ELIGIBILITY:
Stormwater discharges associated with construction activities disturbing individually one (1) acre or more, including, in the case of a common plan of development, contiguous construction activities that cumulatively equal one (1) acre or more of disturbance.

EXCLUSIONS:
The following are excluded from coverage under this general permit:
1) Are conducted at or on properties that have obtained an individual KPDES permit for the discharge of other wastewaters which requires the development and implementation of a Best Management Practices (BMP) plan;
2) Any operation that the DOW determines an individual permit would better address the discharges from that operation;
3) Any project that discharges to an Impaired Water listed in the most recent Integrated Report, §305(b) as impaired for sediment and for which an approved TMDL has been developed.

SECTION I -- FACILITY OPERATOR INFORMATION (PERMITTEE)

Company Name:(✓)	First Name:(✓)	M.I.:	Last Name:(✓)
Kentucky Transportation Cabinet	Robert	A	Yeager

Mailing Address:(*)	City:(*)	State:(*)	Zip:(*)
421 Buttermilk Pike	Covington	Kentucky	41017

eMail Address:(*)	Business Phone:(*)	Alternate Phone:
anthony.griggs@ky.gov	8593412700	Phone

SECTION II -- GENERAL SITE LOCATION INFORMATION

Project Name:(*)	Status of Owner/Operator(*)	SIC Code(*)
Houston Road Extension	State Government	1611 Highway and Street Const

Company Name:(✓)	First Name:(✓)	M.I.:	Last Name:(✓)
Kentucky Transportation Cabinet	Robert	A	Yeager

Site Physical Address:(*)
3448 Houston Road

City:(*)	State:(*)	Zip:(*)
Erlanger	Kentucky	41018

County:(*)	Latitude(decimal degrees)(*)DMS to DD Converter (https://www.fcc.gov/media/radio/dms-decimal)	Longitude(decimal degrees)(*)
Kenton	39.031004	-84.615235

SECTION III -- SPECIFIC SITE ACTIVITY INFORMATION

Project Description:(*)
Roadway reconstruction

a. For single projects provide the following information

Total Number of Acres in Project:(✓)	Total Number of Acres Disturbed:(✓)
1.5	1.5

Anticipated Start Date:(✓)	Anticipated Completion Date:(✓)
8/1/2023	5/15/2024

b. For common plans of development provide the following information

Total Number of Acres in Project:(✓)	Total Number of Acres Disturbed:(✓)
# Acre(s)	# Acre(s)

Number of individual lots in development, if applicable:(✓)

lot(s)

Number of lots in development:(✓)

lot(s)

Total acreage of lots intended to be developed:(✓)

Project Acres

Number of acres intended to be disturbed at any one time:(✓)

Disturbed Acres

Anticipated Start Date:(✓)

Anticipated Completion Date:(✓)

List Building Contractor(s) at the time of Application:(*)

	Company Name	
+		

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

Discharge Point(s):

	Unnamed Tributary?	Latitude	Longitude	Receiving Water Name	
1	No	39.032583	-84.613992	Dry Creek	Delete
2	No	39.032463	-84.613994	Dry Creek	Delete
3	No	39.031136	-84.615172	Dry Creek	Delete
4	No	39.031004	-84.615235	Dry Creek	Delete
5	No	39.030193	-84.614826	Dry Creek	Delete
6	No	39.030122	-84.614840	Dry Creek	Delete
+					

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

Name of MS4:

Date of application/notification to the MS4 for construction site permit coverage:

Discharge Point(s):(*)

Date	Latitude	Longitude	
	+		

SECTION VI -- WILL THE PROJECT REQUIRE CONSTRUCTION ACTIVITIES IN A WATER BODY OR THE RIPARIAN ZONE?

Will the project require construction activities in a water body or the riparian zone?:(*)	Yes
If Yes, describe scope of activity: (✓)	Culvert replacement
Is a Clean Water Act 404 permit required?:(*)	Yes
Is a Clean Water Act 401 Water Quality Certification required?:(*)	Yes

SECTION VII -- NOI PREPARER INFORMATION

First Name:(*)	M.I.:	Last Name:(*)	Company Name:(*)
First Name	MI	Last Name	Company Name

Mailing Address:(*)	City:(*)	State:(*)	Zip:(*)
Mailing Address	City		Zip

eMail Address:(*)	Business Phone:(*)	Alternate Phone:
eMail Address	Phone	Phone

SECTION VIII -- ATTACHMENTS

Facility Location Map:(*)	Upload file
Supplemental Information:	Upload file

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:(*)		Title:(*)	
Signature		Title	
First Name:(*)	M.I.:	Last Name:(*)	
First Name	MI	Last Name	
eMail Address:(*)	Business Phone:(*)	Alternate Phone:	Signature Date:(*)
eMail Address	Phone	Phone	Date

Click to Save Values for Future Retrieval | Click to Submit to EEC

Forms - Form Details

Form Details:

Form Name:

KPDES NOI for KYR10 (Construction Stormwater General Permit)

Form Id:

48

eForm Submittal ID:

358290

eForm Transaction ID:

e782eb27-9858-4953-8c97-57fb00d7b7b3

Status: Help

User Saved

Date:

05/09/2023

Submitted to EEC?: Help

No

Form Info: Help

Continue with this eForm

Create a new eForm with values from this previously saved/submitted eForm.

Delete

Assign Submittal:

	User Name	First	Middle	Last
☑	Mike.Bezold@ky.gov	Mike		Bezold

Compare:

Help

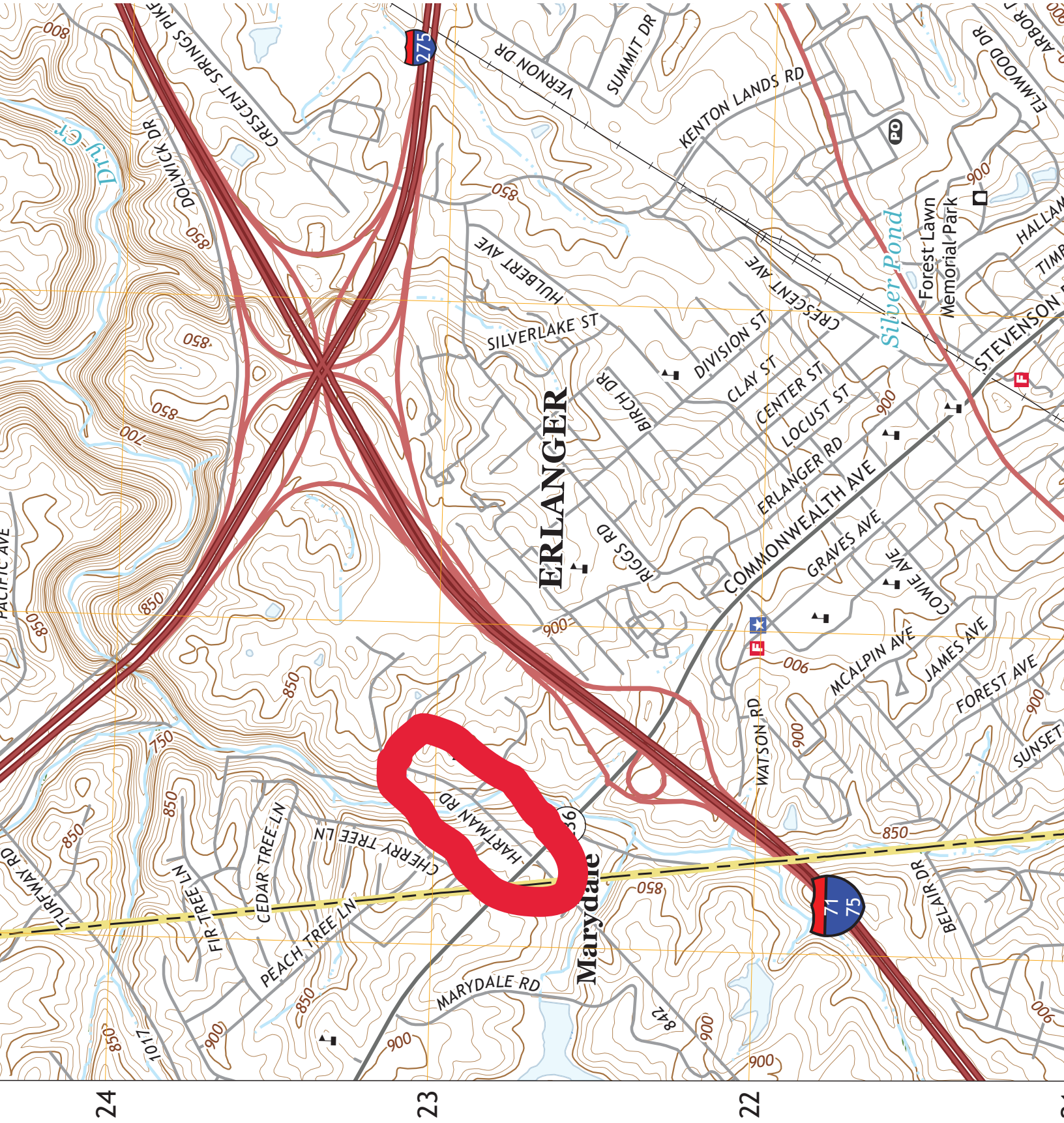
"Left" eForm Submittal ID: 358290

"Right" eForm Submittal ID: *Select (right) Form to compare...*

Run Compare and Download Results

User Interface issues: 1. This website requires browser versions Internet Explorer 11+, Firefox 26+, and Chrome 34+. Firefox and Chrome are the recommended browsers. 2. This website requires Adobe Flash. 3. For Security reasons, the website only supports 45 minutes to complete data entry at any given time and will 'timeout', preventing the ability to save or submit your data. Please keep this in mind when filling out an eForm and remember to save often. 4. Please note that the Internet Explorer Browser uses

the Backspace key as a Hot-Key for the Back button (Previous Page). When selecting values from a Dropdown List, using the backspace key will take you to the previous page and you will need to reenter your information.


ERLANGER
Marydale
Silver Pond
Forest Lawn Memorial Park
KENTON LANDS RD
VERNON DR
SUMMIT DR
CRESCENT SPRINGS PIKE
DOLWICK DR
HULBERT AVE
SILVERLAKE ST
DIVISION ST
CLAY ST
CENTER ST
LOCUST ST
BIRCH DR
RIGGS RD
ERLANGER RD
COMMONWEALTH AVE
GRAVES AVE
COWIE AVE
MCALPIN AVE
JAMES AVE
FOREST AVE
SUNSET
WATSON RD
STEVENSON
CRESCENT AVE
ELMWOOD DR
HARTMAN RD
CHERRY TREE LN
CEDAR TREE LN
FIR TREE LN
PEACH TREE LN
MARYDALE RD
TURFWAY RD
BELAIR DR
PACIFIC AVE
DRY G
275
71
75
24
23
22

Andy Beshear
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 Sower Boulevard
Frankfort, Kentucky 40601
Phone: (502) 564-2150
Fax: 502-564-4245

Rebecca W. Goodman
SECRETARY

Anthony R. Hatton
COMMISSIONER

February 6, 2023

Lydia Watkins, P.E.
1045 Eaton Dr
Fort Wright, KY 41017

Re: CS-3000 Extend Houston Road to Cinema Property
Kenton County, Kentucky
Northern KY Sanitation District 1 Dry Creek WWTP
Activity ID #: 2449, APE20230001
Receiving Treatment Plant KPDES #: KY0024166

Dear Ms. Watkins:

In accordance with KRS Chapter 224.10-100 (19) and based on certification of the Northern Kentucky Sanitation District No. 1 that the review and approval of the design was performed in accordance with 401 KAR 5:005 and generally accepted engineering principles and that the design meets or exceeds the requirements of 401 KAR 5:005, the Energy and Environment Cabinet approves the Construction Permit Application for Sewer Line Construction signed on October 31, 2022.

If we can be of any further assistance or should you wish to discuss this correspondence, please do not hesitate to contact Mr. Mohammed Mohiuddin at 502-782-7020.

Sincerely,

Terry Humphries, P.E.
Supervisor, Engineering Section
Water Infrastructure Branch
Division of Water

TH / MM
Enclosures
c: Northern Kentucky Health Department
GRW Engineers Inc
Division of Plumbing
Sanitation District No. 1

Sewer Line Construction Certified

Northern KY Sanitation District 1 Dry Creek WWTP

Facility Requirements

Activity ID No.:APE20230001

PORT0000000509 (Dry Creek WWTP) CS-3000 Extend Houston Road to Cinema:

Submittal/Action Requirements:

Condition No.	Condition
S-1	When this system is completed, the applicant shall submit written certification: Due 30 calendar days after Completion of Construction to the Division of Water that the facilities have been constructed and tested in accordance with the approved plans and specifications and the approval conditions. Such certification shall be signed by a registered professional engineer. Failure to certify may result in penalty assessment and/or future approvals being withheld. [401 KAR 5:005 Section 24(2)]

Narrative Requirements:

Condition No.	Condition
T-1	The plans and specifications submitted for the project are approved by the Department of Environmental Protection as to sanitary features, subject to the requirements contained within the permit. [401 KAR 5:005 Section 24(3)]
T-2	Authority to construct these sewers is hereby granted. This approval is issued under the provisions of KRS Chapter 224.10-100 (19) regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any permits or licenses required by this Cabinet and other state, federal, and local agencies. [401 KAR 5:005 Section 24(3)(c)2]
T-3	The plans include approximately 45 linear feet of 8 inch PVC Gravity pipe. The flow from these lines is to be treated at the WWTP named "Dry Creek WWTP", KPDES Permit No. KY0024166, Kenton County, Kentucky. [401 KAR 5:005 Section 24(3)(a)]
T-4	Materials, joints, construction and testing shall be in strict accordance with the specifications for Northern Kentucky Sanitation District No. 1 on file with the Division of Water. [Ten States (WW) 33.81]
T-5	The sewer line extension approval is for 1 other connections . The anticipated additional flow is 0 gpd. The current dailty flow is 0. [401 KAR 5:005 Section 1(2)]
T-6	Sewer lines crossing water mains shall be laid to provide a vertical distance of eighteen (18) inches between the outside of the water main and the outside of the sewer line. This shall be the case where the water main is either above or below the sewer line. The crossing shall be arranged so that the sewer line joints are equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main. [Ten States (WW) 38.32]

Sewer Line Construction Certified
Northern KY Sanitation District 1 Dry Creek WWTP
Facility Requirements

Activity ID No.:APE20230001

PORT0000000509 (Dry Creek WWTP) CS-3000 Extend Houston Road to Cinema:

Narrative Requirements:

Condition No.	Condition
T-7	Sewer lines shall be laid at least ten (10) feet horizontally from any existing or proposed water main. The distance shall be measured from edge to edge. [Ten States (WW) 38.31]
T-8	Facilities shall be designed and constructed in accordance with the "Recommended Standards for Wastewater Facilities" of the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers, commonly referred to as "Ten States' Standards", 2014 edition. [401 KAR 5:005 Section 7(1)(a)]
T-9	The permit is issued to the applicant, and the permittee shall remain the responsible party for compliance with all applicable statutes and administrative regulations until a notarized applicable change in ownership certification is submitted and the transfer of ownership is acknowledged by the cabinet. [401 KAR 5:005 Section 28(1)]
T-10	There shall be no deviations from the plans and specifications submitted with the application or the conditions specified, unless authorized in writing by the cabinet. [401 KAR 5:005 Section 24(3)(b)1]
T-11	The issuance of a permit by the cabinet does not convey any property rights of any kind or any exclusive privilege. [401 KAR 5:005 Section 24(5)]
T-12	A permit to construct a facility shall be effective and valid for twenty-four (24) months upon issuance unless otherwise conditioned. If construction has not commenced within twenty-four (24) months following a permit's issuance, a new permit shall be obtained before construction may begin. [401 KAR 5:005 Section 24(1)]
T-13	The Construction Permit is effective on February 6, 2023 and expires on February 6, 2025. [401 KAR 5:005 Section 24(1)]

PART II

SPECIFICATIONS AND STANDARD DRAWINGS

STANDARD SPECIFICATIONS

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

SUPPLEMENTAL SPECIFICATIONS

The contractor shall use the Supplemental Specifications that are effective at the time of letting. The Supplemental Specifications can be found at the following link:
http://transportation.ky.gov/Construction/Pages/Kentucky-Standard-Specifications.aspx

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SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

2.0 MATERIALS.

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

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

2.2 Sign and Controls. All signs must:

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.

1I

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

11F

SPECIAL NOTE FOR TURF REINFORCING MAT

1.0 DESCRIPTION. Install turf reinforcement mat at locations specified in the Contract or as the Engineer directs. Section references herein are to the Department's Current 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.

2.2 Classifications

The basis for selection of the type of mat required will be based on the long term shear stress level of the mat of the channel in question or the degree of slope to protect and will be designated in the contract. The Type 4 mats are to be used at structural backfills protecting critical structures, utility cuts, areas where vehicles may be expected to traverse the mat, channels with large heavy drift, channels with high shear stresses, 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.

Properties	Type 1	Type 2	Type 3	Type 4
Maximum Slope (H:V)	1:1	1:1	0.5:1	0.5:1
Un-vegetated Shear	≥ 2.0 lbs/ft^2 (≥ 96 Pa)	≥ 2.0 lb/ft2 (≥ 96 Pa)"	≥ 2.0 lb/ft2 (≥ 96 Pa)	≥ 2.0 lb/ft2 (≥ 96 Pa)

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Stress[b, c, d] ASTM D6460				
Vegetated Shear Stress [c, d, e, f] ASTM D6460	≥ 6.0 lbs/ft^2 (≥ 287 Pa)	≥ 8.0 lb/ft2 (≥ 383 Pa)	≥ 10.0 lb/ft2 (≥ 479 Pa)	≥ 12.0 lb/ft2 (≥ 575 Pa)
Seedling Emergence [d] ASTM D7322	≥ 250%	≥ 250%	≥ 250%	≥ 250%
MD Material Tensile Strength [d, f] ASTM D6818	≥ 150 lbs/ft (≥ 2.2 kN/m)	≥ 175 lbs/ft (≥ 2.6 kN/m)	≥ 200 lbs/ft (≥ 2.9 kN/m)	≥ 1,500 lbs/ft (≥ 21.9 kN/m)
TD Material Tensile Strength [d, f] ASTM D6818	≥ 150 lbs/ft (≥ 2.2 kN/m)	≥ 175 lbs/ft (≥ 2.6 kN/m)	≥ 200 lbs/ft (≥ 2.9 kN/m)	≥ 1,500 lbs/ft (≥ 21.9 kN/m)
Mass Per Unit Area [d] ASTM D6566	≥ 8.0 oz/yd^2 (≥ 271 g/m^2))	≥ 8.0 oz/yd^2 (≥ 271 g/m2)	≥ 8.0 oz/yd^2 (≥ 271 g/m2)	≥ 8.0 oz/yd2 (≥ 271 g/m2)
Material Thickness [d] ASTM D6525	≥ 0.25 in (≥ 6.35 mm)	≥ 0.25 in (≥ 6.35 mm)	≥ 0.25 in (≥ 6.35 mm)	≥ 0.25 in (≥ 6.35 mm)
UV Stability [c, e] ASTM D4355	≥ 80% @ 500 hrs	≥ 80% @ 500 hrs	≥ 80% @ 1,000 hrs	≥ 90% @ 1,000 hrs

a. For Type 4 mats, property values tested per ASTM D6818 and D6525 are reported as minimum average roll values (MARVs). MARVs are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

b. Required minimum shear stress TRM (un-vegetated) can sustain without physical damage or excess erosion (> 12.7 mm (0.5 in.) soil loss during successive, minimum 30 minute flow events in large scale testing.

c. Acceptable large-scale testing protocol may include ASTM D6460, or other independent testing deemed acceptable by the engineer. Large-scale performance testing typically involves limited soil types and vegetative stands, therefore it is recommended that an appropriate factor of safety be used in design and product selection (see Guidance Document for further information).

d. Typical values are calculated as the average value, it yields a 50% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

e. Required minimum shear stress TRM (fully vegetated) can sustain without physical damage or excess erosion (> 12.7 mm (0.5 in.) soil loss during successive, minimum 30 minute flow events in large scale testing.

f. For TRMs containing degradable components, property values must be obtained on the non-degradable portion of the matting alone.

NOTE: TRMs are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks, and shorelines, where erosive forcers may exceed the limits of natural, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.

2.3 Quality Assurance Sampling, Testing, and Acceptance

A) 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.

B) 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.

C) 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.

D) 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. Mats that exceed the criteria for KYTC Types 1-4 are available. Contact an erosion control material supplier for more information.

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., 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:

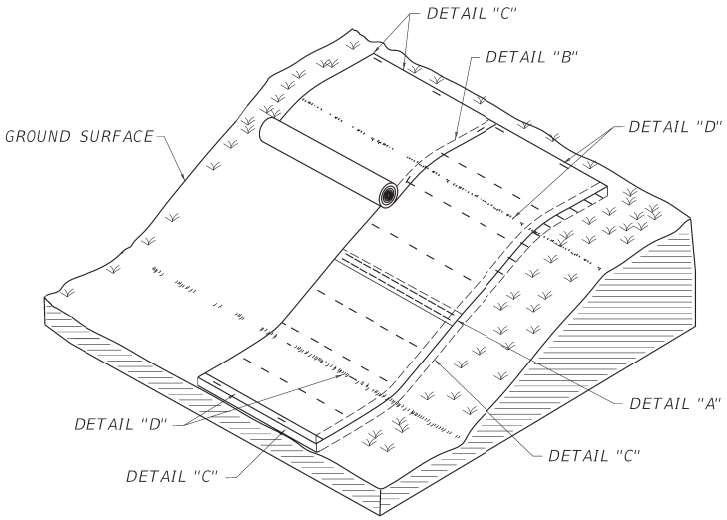
3.1 Site Preparation. Smoothly grade areas to be treated with matting and compact. Remove large
rocks, soil clods, vegetation, roots, and other sharp objects that could keep the mat from intimate contact with subgrade. Prepare seedbed by loosening the top 2 to 3 inch of soil.

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. Infill and overfill the mat with a minimum of ½" of soil as directed by the Manufacturer.

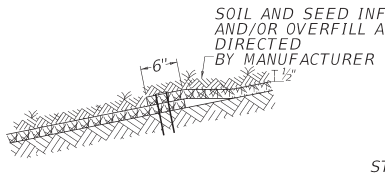
4.0 MEASUREMENT. The Department will measure the quantity of Turf Reinforcement Mat by the square yard of surface covered. The Department will not measure preparation of the bed, providing a Manufacturer's Representative, topsoil, or seeding for payment and will consider them incidental to the Turf Reinforcement 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



TURF MAT
SLOPE INSTALLATION



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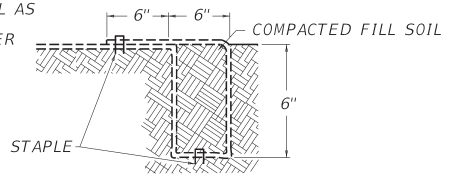
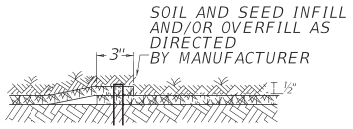
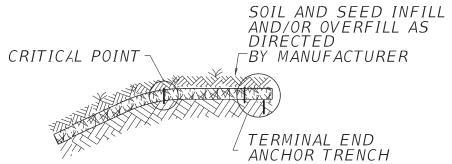
DETAIL "A"

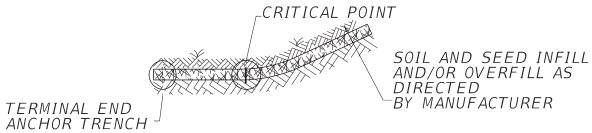


ANCHOR TRENCH
DETAIL "C"



LONGITUDINAL OVERLAP
DETAIL "B"





CRITICAL POINTS
DETAIL "D"

~ NOTES ~

1. CONSTRUCT A 6" X 6" ANCHOR TRENCH AT THE BEGINNING OF THE SLOPE. LINE THE ANCHOR TRENCH WITH TURF REINFORCING MAT LEAVING 12" EXTENDING PAST THE ANCHOR TRENCH. FASTEN THE MAT MATERIAL INTO THE ANCHOR TRENCH ON 12" CENTERS BACKFILL THE TRENCH WITH TOPSOIL AND COMPACT. COVER THE AREA WITH THE REMAINING 12" OF THE MAT'S TERMINAL END LEAVING 6" TO OVERLAP THE TURF REINFORCING MAT. SECURE THE 6" OVERLAP WITH STAPLES ON 12" CENTERS.
2. UNROLL THE MAT DOWN THE SLOPE AND PLACE IN DIRECT CONTACT WITH THE SOIL SURFACE. INSURE THAT THE SOIL SURFACE IS GRADED SMOOTHLY AND DOES NOT CONTAIN IRREGULARITIES.
3. SECURELY FASTEN THE MAT TO THE SOIL BY INSTALLING STAPLES AT A MINIMUM RATE OF 1.5 PER SQ. YD. ANCHORS SHALL BE SELECTED SO THAT THEY HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. INCREASE ANCHORING FREQUENCY FOR SITE CONDITIONS (LOOSE, SANDY, OR WET SOILS) AS DIRECTED BY THE ENGINEER AND MANUFACTURER'S REPRESENTATIVE.
4. OVERLAP EDGES OF MATS ACCORDING TO THE LONGITUDINAL AND TRANSVERSE OVERLAP DETAILS. STAPLE LONGITUDINAL OVERLAPS WITH 2 ROWS OF STAPLES STAGGERED AT 4". STAPLE TRANSVERSE OVERLAPS WITH 1 ROW OF STAPLES SPACED AT 12'.
5. CONSTRUCT A 6"X 12" ANCHOR TRENCH AT THE TOE OF THE SLOPE FOLLOWING SIMILAR PROCEDURE DENOTED FOR THE TOP OF THE SLOPE ANCHOR TRENCH.
6. ENSURE THAT THE MAT IS IN DIRECT CONTACT WITH THE SOIL SURFACE WITH NO PROJECTIONS OR PROTRUSIONS.
7. INFILL AND OVERFILL THE MAT WITH A MINIMUM OF ½" TOPSOIL. APPLY SEEDING AND PROTETION AS DIRECTED BY THE MANUFACTURER. USE SEED MIX TYPE 1 AS DEFINED IN SECTION 212.03.03. TOPSOIL IS THE SOIL PROFILE DEFINED TECHNICALLY AS "A" HORIZON BY THE SOIL SCIENCE SOCIETY OF AMERICA. USE LOOSE, FRIABLE TOPSOIL THAT IS FREE OF STONES 1" OR GREATER IN OVERALL DIMENSIONS, ADMIXTURE OF SUBSOIL, REFUSE, STUMPS, ROOTS, BRUSH, WEEDS AND OTHER MATERIALS THAT PREVENT THE FORMATION OF A SUITABLE SEED BED. DO NOT USE TOPSOIL FROM SITES HAVING JOHNSON GRASS, CANADA THISTLE, QUACK GRASS, NODDING THISTLE OR EXCESSIVE AMOUNTS OF WEEDS OR THEIR RHIZOMES.

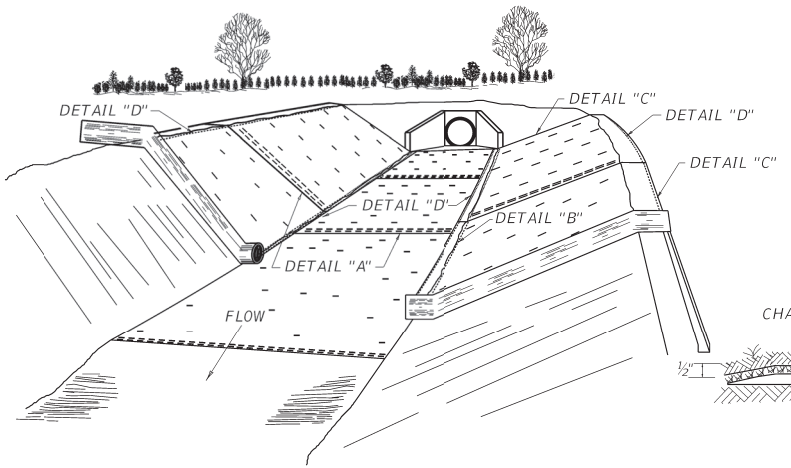
SUBMITTED _____ 01-24-2023
DIVISION DIRECTOR DATE

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY

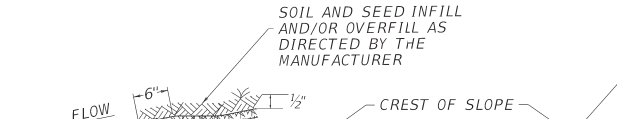
DRAWING TITLE: SEPIA 22 - TURF MAT SLOPE INSTALLATION

ITEM NO. COUNTY OF
SHEET NO.

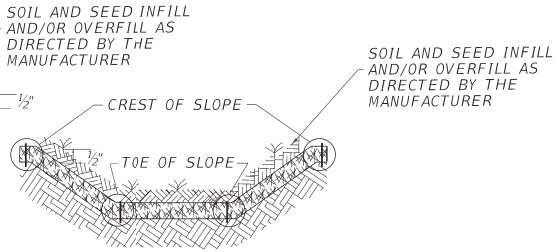
OpenRoads Designer v10.16.2.267 USER: cwillmerdinger FILE NAME: C:\PWWORK\KYTC_CWILLMERDINGER\D2168265\RDI040 - TURF MAT SLOPE INSTALLATION.DGN



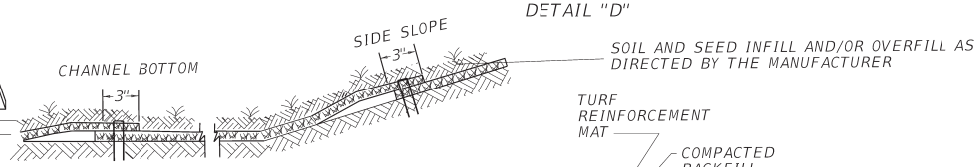
TURF MAT
CHANNEL INSTALLATION



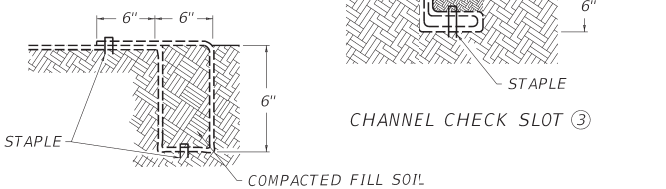
TRANSVERSE OVERLAP
DETAIL "A"



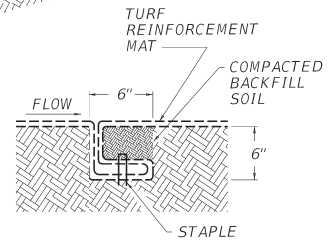
CRITICAL POINTS
DETAIL "D"



LONGITUDINAL OVERLAP
DETAIL "B"



ANCHOR TRENCH
DETAIL "C"



CHANNEL CHECK SLOT ③

~ NOTES ~

1. CONSTRUCT A 6" X 6" ANCHOR TRENCH AT THE UPSTREAM END OF THE CHANNEL. LINE THE ANCHOR TRENCH WITH TURF REINFORCIG MAT LEAVING 12" EXTENDING PAST THE ANCHOR TRENCH. FASTEN THE MAT MATERIAL INTO THE ANCHOR TRENCH ON 12" CENTERS BACKFILL THE TRENCH WITH TOPSOIL AND COMPACT. COVER THE AREA WITH THE REMAINING 12" OF THE MAT'S TERMINAL END LEAVING 6" TO OVERLAP THE TURF REINFORCING MAT. SECURE THE 6" OVERLAP WITH STAPLES ON 12" CENTERS.
2. UNROLL THE MAT PARALLEL TO THE PRIMARY DIRECTION OF WATER FLOW AND PLACE IN DIRECT CONTACT WITH THE SOIL SURFACE. INSURE THAT THE SOIL SURFACE GRADED SMOOTHLY AND DOES NOT CONTAIN IRREGULARITIES.

③ EXCAVATE 6" X 6" CHECK SLOTS EVERY 25' ALONG THE LENGTH OF THE CHANNEL. LINE THE SIDE AND BOTTOM OF THE SLOT WITH THE MAT AND THEN PULL BACK OVER. FASTEN WITH STAPLES ON 12" CENTERS. FILL THE CHECK SLOT WITH TOPSOIL, COMPACT, AND CONTINUE UNROLLING MAT DOWN THE CHANNEL.

4. CONTINUE UNROLLING THE MAT DOWNSTREAM OVER THE COMPACTED SLOT TO THE NEXT CHECK SLOT OR TERMINAL ANCHOR TRENCH. IF MORE THAN ONE SECTION OF MAT, AS SHOWN IN THE TRANSVERSE OVERLAP DETAIL, IS USED OVERLAP UPSTREAM MATS OVER TOP OF THE DOWNSTREAM MAT 6" AND SECURE. IF MATS ARE PLACED PARALLEL TO EACH OTHER ALONG THE CHANNEL, PLACE CHANNEL SECTIONS FIRST, THEN OVERLAP SIDE SLOPE SECTIONS 3" OVER THE CHANNEL SECTIONS AS SHOWN IN THE LONGITUDINAL OVERLAP DETAIL, AND SECURE WITH STAPLES ON 12" CENTERS. PROCEED UP THE SIDE SLOPES IN THE SAME MANNER UNTIL THE TOP OF CHANNEL IS REACHED.
5. SECURE MATS WHILE UNROLLING ON SIDESLOPES AND CHANNEL BOTTOMS WITH STAPLES AT A FREQUENCY THE TABLE INDICATES. USE STAPLES HAVING SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. INCREASE ANCHORING FREQUENCY AS DIRECTED BY THE ENGINEER AND MANUFACTURER'S REPRESENTATIVE.
6. INFILL AND OVERFILL THE MAT WITH A MINIMUM OF ½" TOPSOIL. APPLY SEEDING AND PROTECTION AS DIRECTED BY THE MANUFACTURER. USE SEED MIX TYPE 1 AS DEFINED IN SECTION 212.03.03. TOPSOIL IS THE SOIL PROFILE DEFINED TECHNICALLY AS "A" HORIZON BY THE SOIL SCIENCE SOCIETY OF AMERICA. USE LOOSE, FRIABLE TOPSOIL THAT IS FREE OF STONES 1" OR GREATER IN OVERALL DIMENSIONS, ADMIXTURE OF SUBSOIL, REFUSE, STUMPS, ROOTS, BRUSH, WEEDS AND OTHER MATERIALS THAT PREVENT THE FORMATION OF A SUITABLE SEED BED. DO NOT USE TOPSOIL FROM SITES HAVING JOHNSON GRASS, CANADA THISTLE, QUACK GRASS, NODDING THISTLE OR EXCESSIVE AMOUNTS OF WEEDS OR THEIR RHIZOMES.

SLOPE GRADE	ANCHORING FREQUENCY
UP TO 2H:1V	1.5 ANCHORS/SQYD
2H:1V TO 1H:1V	2.0 ANCHORS/SQYD
STEEPER THAN 1H:1V AND CHANNEL BOTTOMS	3.0 ANCHORS/SQYD

SUBMITTED W. J. Logan 01-24-2023
DIVISION DIRECTOR DATE

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
TEAM KENTUCKY

DRAWING TITLE: SEPIA 23 - TURF MAT CHANNEL INSTALLATION

ITEM NO. COUNTY OF
SHEET NO.

OpenRoads Designer v10.16.2.267 USER: cwillmerdinger FILE NAME: C:\PWWORK\KYTC_CWILLMERDINGER\D2168266\RDI041 - TURF MAT CHANNEL INSTALLATION.DGN

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

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

I. APPLICATION

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

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

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

II. NONDISCRIMINATION OF EMPLOYEES

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

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

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

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

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

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

Revised: January 25, 2017

EXECUTIVE BRANCH CODE OF ETHICS

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

KRS 11A.040 (7) provides:

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

KRS 11A.040 (9) states:

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

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

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

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

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

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

Revised: May 23, 2022

Kentucky Equal Employment Opportunity Act of 1978

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

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

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

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

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

EMPLOYEE RIGHTS
UNDER THE FAIR LABOR STANDARDS ACT

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

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

OVERTIME PAY

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

CHILD LABOR

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

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

No more than

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

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

TIP CREDIT

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

ENFORCEMENT

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

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

ADDITIONAL INFORMATION

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

For additional information:

1-866-4-USWAGE

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

WHD U.S. Wage and Hour Division

WWW.WAGEHOUR.DOL.GOV

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

WHD Publication 1088 (Revised July 2009)

PART IV

INSURANCE

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

PART V

BID ITEMS

231337

PROPOSAL BID ITEMS

Report Date 8/28/23

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	6,605.00	TON		$	
0020	00008		CEMENT STABILIZED ROADBED	9,914.00	SQYD		$	
0030	00100		ASPHALT SEAL AGGREGATE	5.13	TON		$	
0040	00103		ASPHALT SEAL COAT	.62	TON		$	
0050	00194		LEVELING & WEDGING PG76-22	302.00	TON		$	
0060	00214		CL3 ASPH BASE 1.00D PG64-22	1,303.00	TON		$	
0070	00216		CL3 ASPH BASE 1.00D PG76-22	1,110.00	TON		$	
0080	00221		CL2 ASPH BASE 0.75D PG64-22	18.00	TON		$	
0090	00301		CL2 ASPH SURF 0.38D PG64-22	18.00	TON		$	
0100	00336		CL3 ASPH SURF 0.38A PG76-22	805.00	TON		$	
0110	00356		ASPHALT MATERIAL FOR TACK	5.70	TON		$	
0120	00358		ASPHALT CURING SEAL	9.90	TON		$	
0130	02542		CEMENT	185.00	TON		$	
0140	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		$	
0150	02677		ASPHALT PAVE MILLING & TEXTURING	349.00	TON		$	
0160	02702		SAND FOR BLOTTER	25.00	TON		$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0170	00078		CRUSHED AGGREGATE SIZE NO 2	330.00	TON		$	
0180	01810		STANDARD CURB AND GUTTER	3,490.00	LF		$	
0190	01921		STANDARD BARRIER MEDIAN TYPE 4	92.00	SQYD		$	
0200	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	5.00	EACH		$	
0210	02159		TEMP DITCH	860.00	LF		$	
0220	02160		CLEAN TEMP DITCH	430.00	LF		$	
0230	02200		ROADWAY EXCAVATION	5,945.00	CUYD		$	
0240	02223		GRANULAR EMBANKMENT	350.00	CUYD		$	
0250	02242		WATER	172.00	MGAL		$	
0260	02351		GUARDRAIL-STEEL W BEAM-S FACE	475.00	LF		$	
0270	02367		GUARDRAIL END TREATMENT TYPE 1	2.00	EACH		$	
0280	02432		WITNESS POST	17.00	EACH		$	
0290	02483		CHANNEL LINING CLASS II	15.00	TON		$	
0300	02484		CHANNEL LINING CLASS III	124.00	TON		$	
0310	02545		CLEARING AND GRUBBING -	1.00	LS		$	
0320	02555		CONCRETE-CLASS B	21.00	CUYD		$	
0330	02562		TEMPORARY SIGNS	54.00	SQFT		$	
0340	02585		EDGE KEY	152.00	LF		$	
0350	02602		FABRIC-GEOTEXTILE CLASS 1	1,189.00	SQYD		$	
0360	02603		FABRIC-GEOTEXTILE CLASS 2	1,050.00	SQYD		$	
0370	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		$	
0380	02671		PORTABLE CHANGEABLE MESSAGE SIGN	3.00	EACH		$	
0390	02690		SAFELOADING	66.40	CUYD		$	
0400	02701		TEMP SILT FENCE	860.00	LF		$	

231337

PROPOSAL BID ITEMS

Report Date 8/28/23

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0410	02703		SILT TRAP TYPE A	5.00	EACH		$	
0420	02704		SILT TRAP TYPE B	5.00	EACH		$	
0430	02705		SILT TRAP TYPE C	5.00	EACH		$	
0440	02706		CLEAN SILT TRAP TYPE A	5.00	EACH		$	
0450	02707		CLEAN SILT TRAP TYPE B	5.00	EACH		$	
0460	02708		CLEAN SILT TRAP TYPE C	5.00	EACH		$	
0470	02720		SIDEWALK-4 IN CONCRETE	887.00	SQYD		$	
0480	02726		STAKING	1.00	LS		$	
0490	03171		CONCRETE BARRIER WALL TYPE 9T	1,040.00	LF		$	
0500	05950		EROSION CONTROL BLANKET	605.00	SQYD		$	
0510	05952		TEMP MULCH	12,390.00	SQYD		$	
0520	05953		TEMP SEEDING AND PROTECTION	9,300.00	SQYD		$	
0530	05963		INITIAL FERTILIZER	.60	TON		$	
0540	05964		MAINTENANCE FERTILIZER	.60	TON		$	
0550	05985		SEEDING AND PROTECTION	17,995.00	SQYD		$	
0560	05990		SODDING	1,432.00	SQYD		$	
0570	05992		AGRICULTURAL LIMESTONE	11.60	TON		$	
0580	06510		PAVE STRIPING-TEMP PAINT-4 IN	6,880.00	LF		$	
0590	06515		PAVE STRIPING-PERM PAINT-6 IN	9,024.00	LF		$	
0600	06565		PAVE MARKING-THERMO X-WALK-6 IN	307.00	LF		$	
0610	06568		PAVE MARKING-THERMO STOP BAR-24IN	48.00	LF		$	
0620	06574		PAVE MARKING-THERMO CURV ARROW	4.00	EACH		$	
0630	06610		INLAID PAVEMENT MARKER-MW MONO DIRECTION WHITE	6.00	EACH		$	
0640	06612		INLAID PAVEMENT MARKER-BY BI DIRECTION YELLOW	3.00	EACH		$	
0650	08901		CRASH CUSHION TY VI CLASS BT TL2	1.00	EACH		$	
0660	10020NS		FUEL ADJUSTMENT	11,247.00	DOLL	$1.00	$	$11,247.00
0670	10030NS		ASPHALT ADJUSTMENT	13,903.00	DOLL	$1.00	$	$13,903.00
0680	20191ED		OBJECT MARKER TY 3	2.00	EACH		$	
0690	21289ED		LONGITUDINAL EDGE KEY	2,530.00	LF		$	
0700	23158ES505		DETECTABLE WARNINGS	50.00	SQFT		$	
0710	23274EN11F		TURF REINFORCEMENT MAT 1	690.00	SQYD		$	
0720	24540		R/W MONUMENT TYPE 3	17.00	EACH		$	
0730	24640ED		OBJECT MARKER TYPE 1	1.00	EACH		$	
0740	24814EC		PIPELINE INSPECTION	1,215.00	LF		$	
0750	24845EC		UTILITY COORDINATION	1.00	LS		$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0760	00521		STORM SEWER PIPE-15 IN	292.00	LF		$	
0770	00522		STORM SEWER PIPE-18 IN	297.00	LF		$	
0780	00524		STORM SEWER PIPE-24 IN	539.00	LF		$	
0790	00526		STORM SEWER PIPE-30 IN	263.00	LF		$	
0800	00528		STORM SEWER PIPE-36 IN	170.00	LF		$	
0810	01001		PERFORATED PIPE-6 IN	22.00	LF		$	
0820	01011		NON-PERFORATED PIPE-6 IN	6.00	LF		$	
0830	01202		PIPE CULVERT HEADWALL-15 IN	1.00	EACH		$	

PROPOSAL BID ITEMS

231337

Report Date 8/28/23

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0840	01204		PIPE CULVERT HEADWALL-18 IN	2.00	EACH		$	
0850	01210		PIPE CULVERT HEADWALL-30 IN	1.00	EACH		$	
0860	01212		PIPE CULVERT HEADWALL-36 IN	1.00	EACH		$	
0870	01456		CURB BOX INLET TYPE A	16.00	EACH		$	
0880	01493		DROP BOX INLET TYPE 2	1.00	EACH		$	
0890	01538		DROP BOX INLET TYPE 7	1.00	EACH		$	
0900	01544		DROP BOX INLET TYPE 11	2.00	EACH		$	
0910	01643		JUNCTION BOX-24 IN	1.00	EACH		$	
0920	02607		FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	2,472.00	SQYD	$2.00	$	$4,944.00

Section: 0004 - BRIDGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0930	02403		REMOVE CONCRETE MASONRY	82.20	CUYD		$	
0940	08002		STRUCTURE EXCAV-SOLID ROCK	122.00	CUYD		$	
0950	08003		FOUNDATION PREPARATION	1.00	LS		$	
0960	08100		CONCRETE-CLASS A	209.80	CUYD		$	
0970	08150		STEEL REINFORCEMENT	33,302.00	LB		$	

Section: 0005 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0980	15091		S LATERAL SPECIAL	1.00	EACH		$	
0990	15092		S MANHOLE	2.00	EACH		$	
1000	15093		S MANHOLE ABANDON/REMOVE	1.00	EACH		$	
1010	15094		S MANHOLE ADJUST TO GRADE	2.00	EACH		$	
1020	15095		S MANHOLE CASTING STANDARD	2.00	EACH		$	
1030	15104		S PIPE DUCTILE IRON 08 INCH	44.60	LF		$	

Section: 0006 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1040	14001		W AIR RELEASE VALVE 3/4 INCH	1.00	EACH		$	
1050	14020		W FIRE HYDRANT RELOCATE	3.00	EACH		$	
1060	14030		W METER RELOCATE	1.00	EACH		$	
1070	14035		W PIPE DUCTILE IRON 04 INCH	20.00	LF		$	
1080	14036		W PIPE DUCTILE IRON 06 INCH	67.00	LF		$	
1090	14037		W PIPE DUCTILE IRON 08 INCH	252.00	LF		$	
1100	14039		W PIPE DUCTILE IRON 12 INCH	1,717.00	LF		$	
1110	14040		W PIPE DUCTILE IRON 16 INCH	23.00	LF		$	
1120	14093		W TIE-IN 04 INCH	1.00	EACH		$	
1130	14094		W TIE-IN 06 INCH	4.00	EACH		$	
1140	14095		W TIE-IN 08 INCH	4.00	EACH		$	
1150	14097		W TIE-IN 12 INCH	1.00	EACH		$	
1160	14098		W TIE-IN 16 INCH	1.00	EACH		$	
1170	14104		W VALVE 04 INCH	1.00	EACH		$	

PROPOSAL BID ITEMS

231337

Report Date 8/28/23

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1180	14105		W VALVE 06 INCH	2.00	EACH		$	
1190	14106		W VALVE 08 INCH	4.00	EACH		$	
1200	14108		W VALVE 12 INCH	9.00	EACH		$	
1210	14149		W SERV COPPER SHORT SIDE 1 IN	1.00	EACH		$	

Section: 0007 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1220	02568		MOBILIZATION	1.00	LS		$	
1230	02569		DEMOBILIZATION	1.00	LS		$	